**Cyclic Aliphatic Bromides Cluster (HBCD)** (CASRN: 25637-99-4; 3194-55-6; 3194-57-8)

Systematic Review Supplemental File for the TSCA Risk Evaluation: Data Quality Evaluation for Occupational Exposure and Release Data Release

Study Citation:					ophosphate and brominated flame retardants from selected			
Data Type Hero ID		products and building materials ommercial Use; Insulation produ	-					
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Represents release in a chamber and may not be fully representative of the circumstances during actual use			
Domain 2: Repre	sentative							
-	Metric 2:	Geographic Scope	Acceptable	3	Germany			
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).			
	Metric 4:	Temporal Representativeness	Acceptable	3	2003			
	Metric 5:	Sample Size	Acceptable	3	There are two insulation samples with four test results - is cahracterized but may not be representative			
Domain 3: Access	sibility/Clar	itv						
	Metric 6: Metadata Completeness			3	Release circumstances are fully characterized			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	Discusses how sample type, chamber temperature, and chamber size may affect results			
Overall Quality I	Determinatio	on*	High	1.6				
Extracted			Yes					
Parameter			– EXTRACTION ———— Data					
Release Source:	Release Source:			Emission from EPS and XPS insulation samples from manufacturers, measured in chamber tests				
Environmental Media: Release or Emission Factor: Release Estimation Method:			Air					
				Emissio	n is ng of HBCD per m2 of insulation per hour. EPS			
			= 4 ng/m2-h and 1 ng/m2-h. XPS = 29 ng/m2-h and 0.1 ng/m2-h. Measured					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		zardous Substances Data, Bank ll; Reports for Data or Informat					
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
1	Metric 2:	Geographic Scope	Acceptable	3	US		
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2001		
	Metric 5:	Sample Size	Unacceptable	4	Sample size not listed, just cites the National Sewage Sludge Survey		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	The report does not address variability or uncertainty with respect to this data element.		
Overall Quality I	Determinatio	,*	Medium	1.9			
Extracted			Yes				
			- EXTRACTION	ON			
Parameter			Data				
Release Source: Disposal /Treatment Method: Environmental Media: Pelease Estimation Method:					e from EPA's 2001 National Sewage Sludge Survey		
			Sewage sludge to Biosolids, land applications, incineration, landfill Water, Land				
Annual Release C	zuantity (kg	/yr):	101-127 kg/yr to biosolids; 49.9-75.9 to land application; 20.8-26 to incineration; 17.7-20.9 kg/yr to landfill				
Waste Treatment	Method:				g/yr to tandin olids, land applications, incineration, landfill		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID					ocyclododecane (HBCD)- PEC34. mpleted Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from 2004 Plastics Compounding and Converting $\operatorname{ESD}$		
Domain 2: Repre	sentative						
•	Metric 2:	Geographic Scope	Acceptable	3	OECD		
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope, but other scenarios are		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	Unacceptable	4	Unknown		
Domain 3: Acces	sibility/Clar	itv					
Domain of Trees.	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability		
Overall Quality I	Determinatio	n*	Medium	1.9			
Extracted			Yes				
Parameter			— EXTRACTION ———— Data				
Environmental Media:			Water, Land, Air, Incineration				
Release or Emission Factor:			Loss fractions cited from the 2004 Plastics Compounding and Converting ESD				
Release Estimation Method:			Estimated				
Release Days per Year:			2004 Plastics Compounding and Converting ESD				
Number of Sites:			2004 Plastics Compounding and Converting ESD  2004 Plastics Compounding and Converting ESD				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID				ocyclododecane (HBCD)- PEC34. eted Exposure or Risk Assessments;				
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliability								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	Australia			
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).			
	Metric 4:	Temporal Representativeness	Acceptable	3	2012			
	Metric 5:	Sample Size	Unacceptable	4	Unknown			
Domain 3: Acces	sibility/Clar	rity						
	Metric 6: Metadata Completeness			3	Information is all clearly cited			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	Discusses variability and uncertainty			
Overall Quality I	Determinatio	n*	High	1.3				
Extracted	Extracted							
Parameter		EXTRACTION ————————————————————————————————————						
Release Source:			Life of EPS /XPS insulation					
Environmental Media:			Air and water					
	Release Estimation Method:			Estimated				
Annual Release Quantity (kg/yr):			1.4 (Air) and 1.4 (Water)					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	ne 2012 annual effluent guideline ll; Reports for Data or Informat	s review report. ion Other than Exposure or Release Data;					
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	EU		
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	Information stated from Europe, unknown sample size		
Domain 3: Acces	. ,	·					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	Discusses variability and uncertainty with regards to limitations on how European data can be applied to US		
Overall Quality l	Determinatio	» Dn	High	1.6			
Extracted			Yes				
Parameter			— EXTRACTION ———— Data				
Release Source:		Data from the United Kingdom indicate that the primary sources of HBCD release are fugitive emissions during its manufacture and subse-					
Environmental Media:		quent use in products, leaching from landfills, and incinerator emissions					
Environmental Media: Release Estimation Method:			50 percent to WWT, 29 percent surface water, 21 percent air Measured				
Annual Release (		g/yr):	3100				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoo isposal; Insulation products in b	-	eted Exp	posure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
1	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	In scope	
	Metric 4:	Temporal Representativeness	Unacceptable	4	1992	
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varia	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	n*	Medium	1.8		
Extracted			Yes			
Parameter		— EXTRACTION ———— Data				
Release Source: Release or Emission Factor:			Building and construction waste Information from industry shows that, in 1992, out of the total construction- and demolition (C&D) waste, plastic waste was 0.4 percent of the weight. EPS and XPS were representing about 3 percent of the plastic waste and therefore 0.01 percent of the total building waste.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoorocessing; Formulation of EPS a			Exposure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relia	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
1	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	HIPS similar but not in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative	
Domain 3: Acces	ssibility/Clar	ity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varia	v	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality	Determinatio	n*	High	1.3		
Extracted			Yes			
Parameter		– EXTRACTION ————————————————————————————————————				
Environmental Media:		WW, surface	e water.	air		
Release Estimati	on Method:		Measured			
Annual Release Quantity (kg/yr):			Table 3-5 = 0.3 to 113.4 (surface water); 0.14 to 20 (WW); 0.029 to 2.2 (air)			
Release Days per	Year:		1 to 340			
Number of Sites:			13			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	8. Risk assessment: hexabromocrocessing; Formulation of EPS a	U		Exposure or Risk Assessments;			
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
Bomain 2. respie	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	HIPS similar but not in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative		
Domain 3: Acces	sibility/Clar Metric 6:	ity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and Un Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	» n	High	1.3			
Extracted			Yes				
Parameter			— EXTRACTION ———— Data				
Environmental Media:		WW, surface	e water.	air			
Release Estimation Method:				that did not provide data using the 90th percentile			
Annual Release Quantity (kg/yr): Release Days per Year: Number of Sites:			of measured values from sites that did provide data  Table 3-6 = 22.8 (surface water), 2.2 (air)  300 6				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromorocessing; XPS Compounding /	·		ted Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative $$		
Domain 3: Acces	sibility/Clar	ity					
Domain 6. Neces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial							
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.1			
Extracted			Yes				
			EVTD ACT	TON			
Parameter		– EXTRACTION ———— Data					
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):		surface wate	r, air				
		Measured					
			0.12 to	37 (WW) and 1.2 to 3.3 (air)			
Release Days per	Year:		300				
Number of Sites:			3				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromorocessing; XPS Compounding /	U		ted Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative		
Domain 3: Acces	ssibility/Clar	ity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	ability and U	ncertainty					
		Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality	Determinatio	n*	High	1.1			
Extracted			Yes				
			- EXTRACT	ΓΙΟΝ -			
Parameter		Data					
Environmental Media:		surface wate	r, air				
Release Estimation Method: $ \label{eq:Annual Release Quantity (kg/yr):} $				that did not provide data using the 90th percentile			
		of measured values from sites that did provide data  Table 3-10 = $26 \text{ (WW)}$ , $2.6 \text{ (air)}$					
							Release Days per
Number of Sites:	:		11				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Domain 1: Reliability   Metric 1: Methodology   Acceptable   3   Information is from trusted sources	Study Citation: Data Type Hero ID	8. Risk assessment: hexabromocrocessing; EPS Converting; Con		e or Risk	x Assessments;			
Metric 1: Methodology	Domain		Metric	Rating	Score	Comments		
Metric 1: Methodology	Domain 1: Relia	bility						
Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Acceptable  Acceptable  3			Methodology	Acceptable	3	Information is from trusted sources		
Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Acceptable  Acceptable  3	Domain 2: Repre	esentative						
Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Overall Quality Determination  Extracted  Parameter  Parameter  Metric 3: Applicability Acceptable Acceptable 3 2008  Unacceptable 4 Distribution of samples characterized by no statistics.  Acceptable 3 Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.  Acceptable 3 The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.  High 1.3  EXTRACTION Data  EXTRACTION EXTRACTION Data  WW, surface water, air Estimated  WW, surface water, air Estimated			Geographic Scope	Acceptable	3	Europe		
Metric 4: Temporal Representativeness Acceptable 4 Distribution of samples characterized by no statistics.  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Acceptable 3 Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Acceptable 3 The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.  Overall Quality Determination  Extracted Yes  EXTRACTION Data  ENvironmental Media: Release Estimation Method:  WW, surface water, air Estimated		Metric 3:	9 1 1					
Metric 5: Sample Size   Unacceptable   4   Distribution of samples characterized by no statistics.		Metric 4:			3	2008		
Metric 6: Metadata Completeness Acceptable 3 Assessment or report clearly documents its data sources, assessment addresses variability and uncertainty Metric 7: Metadata Completeness Acceptable 3 The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.  Overall Quality Determination* High 1.3  Extracted Yes  EXTRACTION  Parameter Data  WW, surface water, air Release Estimation Method:  WW, surface water, air Estimated		Metric 5:		Unacceptable	4	Distribution of samples characterized by no statistics.		
Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Acceptable  3 The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.  Overall Quality Determination*  High  1.3  Extracted  Yes  EXTRACTION  Parameter  Data  Environmental Media: Release Estimation Method:  WW, surface water, air Estimated	Domain 3: Acces	- 1	=	Acceptable	3			
Extracted Yes	Domain 4: Varia	·	· ·	Acceptable	3			
Parameter Data  Environmental Media: WW, surface water, air Release Estimation Method: Estimated	Overall Quality l	Determinatio	* H	High	1.3			
Parameter Data  Environmental Media: WW, surface water, air Release Estimation Method: Estimated	Extracted			Yes				
Release Estimation Method: Estimated	Parameter							
Release Estimation Method: Estimated	Environmental Media:		WW, surface v	vater, ai	r			
	Release Estimation Method: Annual Release Quantity (kg/yr):							
Annual Release Quantity (kg/yr): Table $3-16 = 20.4$ (surface water), $82$ (WW), $102$ (Air)				Table $3-16 = 2$	0.4 (sur	face water), 82 (WW), 102 (Air)		
Release Days per Year: Table 3-5			,					
Number of Sites: hundreds	Number of Sites:			${\rm hundreds}$				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromoorocessing; XPS converting; Com	· ·		sk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative	
Domain 3: Acces	sibility/Clar	ity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	n*	High	1.1		
Extracted			Yes			
		- EXTRACT	TION -			
Parameter		Data				
Environmental Media:		WW, air				
Release Estimation Method:		Measured				
Annual Release Quantity (kg/yr):			Table 3-19 =	= 0 to 4.	2 (WW), 0.31 to 18 (air)	
Release Days per	Year:		15  to  300			
Number of Sites:			4			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromocrocessing; XPS converting; Com	·		sk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative
Domain 3: Acces	sibility/Clar	ity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
		Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n*	High	1.1	
Extracted			Yes		
			- EXTRACT	TION -	
Parameter	Parameter		Data		
Environmental M	Iedia:		WW, air		
Release Estimation	Release Estimation Method:				that did not provide data using the 90th percentile from sites that did provide data
Annual Release C Number of Sites:	Quantity (kg	/yr):			W), 17.4 (air)

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoo ommercial Use; Insulation produ	-	Comple	eted Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
-	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).		
	Metric 4:	Temporal Representativeness	Acceptable	3	sources date back to 2002		
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.		
Domain 3: Acces	sibility/Clar	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.6			
Extracted			Yes				
Parameter			- EXTRACTION - Data	ON —			
Environmental Media:		surface water, WW, air					
Release or Emiss			release factor =	,			
Release Estimati			estimates taken from sources				
Annual Release (	Quantity (kg	/vr)·	Table 3-33 = 54 (air), 0 (surface water and WW)				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromoeisposal; Insulation products in b	·	eted Exp	posure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	oility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.3			
Extracted			Yes				
Parameter			– EXTRACTI Data	ON			
Release Source:			demolotion of	building	s		
Disposal /Treatment Method:		30 percent of boards recycled, requiring manual deconstruction of the structures. The remaining 70 percent of material was disposed of, and these buildings were assumed not to be manually deconstructed.					
Environmental M	Environmental Media:				v		
Release or Emissi	ion Factor:		incineration 5E-06 release factor from incineration to WW or air				
Release Estimation	on Method:		estimated				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		98. Risk assessment: hexabromoecycling; Insulation products in		oleted E	xposure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
1	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varia	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.3		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Release Source: Release or Emission Factor: Release Estimation Method:			demolotion of buildings - breaking boards for recycling 90 g EPS-particles/tonne EPS Measured			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		98. Risk assessment: hexabromocisposal; Insulation products in b	-	eted Exp	posure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.	
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, as-	
					sessment methods, results, and assumptions.	
Domain 4: Varia	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	m*	High	1.3		
Extracted			Yes			
Parameter		_	- EXTRACTI Data	ON —		
Release Source: Release or Emission Factor: Release Estimation Method:			demolotion of buildings - breaking boards for disposal release factor of 0.1 percent estimated			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa rocessing; EPS / XPS Convertin			d all major diastereoisomers identified. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	ility						
	Metric 1:	Methodology	Acceptable	3	Information is from 2004 Plastics Converting ESD		
Domain 2: Repres	entative						
-	Metric 2:	Geographic Scope	Acceptable	3	OECD		
	Metric 3:	Applicability	Acceptable	3	In scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	Unknown		
Domain 3: Access	ibility/Clar	ity					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Variab	ility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability		
Overall Quality D	eterminatio	n*	High	1.7			
Extracted			Yes				
Parameter		EXTRACTION ————————————————————————————————————					
Environmental Media:			Water, Land,	Air, Inci	neration		
Release or Emission Factor:			Loss fractions cited from the 2004 Plastics Converting ESD				
Release Estimation Method:			Estimated				
Release Days per	Year:		2004 Plastics 0	Converti	ng ESD		
Number of Sites:			2004 Plastics (				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa rocessing; Cutting of EPS board	-		d all major diastereoisomers identified. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
-	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2003		
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	Unknown		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n *	High	1.6			
Extracted			Yes				
Parameter			- EXTRACTI Data	on —			
Environmental M	ledia:		50 percent to s	surface v	vater and 50 percent to air or landfill		
Release or Emission Factor:		100 g/tonnes I	HBCDD	from cutting of boards			
Release Estimation Method:		Estimated					
Annual Release Quantity (kg/yr):			95 percent of the particles generated during cutting operations are assumed to end up in waste.				
Release Days per	Year:		?230  days/yr				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromorocessing; Sawing of EPS boards	·	posure o	or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2003		
	Metric 5:	Sample Size	Unacceptable	4	Unknown		
Domain 3: Acces	- /	=					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
D	1.:1:4 J TT						
Domain 4: Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n N	High	1.6			
Extracted			Yes				
Parameter			- EXTRACTI Data	on —			
Environmental M	ledia:		50 percent to s	surface v	vater and 50 percent to air or landfill		
Release or Emission Factor:			445 g particles per tonne EPS being released during sawing of EPS boards				
Release Estimation	Release Estimation Method:						
Annual Release (		/yr):	Measured 95 percent of the particles generated during cutting operations are assumed to end up in waste.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID					d all major diastereoisomers identified. ed Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2003		
	Metric 5:	Sample Size	Unacceptable	4	Unknown		
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	oility and U	ncertainty					
Domestr 1. Variation	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.6			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Environmental M	edia:		50 percent to s	surface v	vater and 50 percent to air		
Release or Emission Factor:		10 g particulat					
Release Estimation Method:			Estimated - During professional use (i.e. at construction sites) it is estimated that only 10 percent of boards are cut				
Release Days per	Year:		250				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	ŭ I			d all major diastereoisomers identified. ted Exposure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2003
	Metric 5:	Sample Size	Unacceptable	4	Unknown
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited
Domain 4: Varial	bility and H	neovtainty			
Domaii 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	» Dn	High	1.6	
Extracted			Yes		
Parameter			- EXTRACTI Data	ON —	
Environmental Media: Release or Emission Factor: Release Estimation Method:			50 percent to s 5 g XPS partic Estimated		vater and 50 percent to air onne XPS

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	v i	· ·		d all major diastereoisomers identified. eted Exposure or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
•	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).			
	Metric 4:	Temporal Representativeness	Acceptable	3	2003			
	Metric 5:	Sample Size	Unacceptable	4	Unknown			
Domain 3: Access	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited			
Domain 4: Varial	vility and III	neort sint v						
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	eterminatio	n <sup>*</sup>	High	1.6				
Extracted			Yes					
Parameter			- EXTRACTION Data	ON				
Release Source:			service life of I	EPS boa	rds at construction sites			
Environmental Media:		water, land, in	cineratio	on				
Release or Emission Factor:		No loss of HBCD is expected to occur in the foam during service life, even when exposed to natural light.						
Release Estimatio	n Method:			The service life of the boards is estimated as 30 to 100 years.				
Release Estimation Method: Release Days per Year:			The service me of the boards is estimated as 50 to 100 years.  365					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,				d all major diastereoisomers identified. eted Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
-	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).		
	Metric 4:	Temporal Representativeness	Acceptable	3	2003		
	Metric 5:	Sample Size	Unacceptable	4	Unknown		
Domain 3: Acces	cibility/Clar	sitv					
Domain 6. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
D	1 '7'. 1 77						
Domain 4: Varial	bility and U: Metric 7:		A4-1-1-	2	TT1		
	Metric 1:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
0 10 10 10		*		1.0			
Overall Quality I	Jeterminatio	on	High	1.6			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Release Source:			service life of I	EPS boa	rds at construction sites		
Environmental Media:		air					
Release or Emission Factor:		release factor =		-			
Release Estimation			over a 100 year		life		
Daily Release Qu			1.8E-05  kg/day				
Annual Release C		/yr):	6.7E-03  kg/yr				
Release Days per Year:			365				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa isposal; Insulation products in b	-		d all major diastereoisomers identified. posure or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative		<del>_</del>					
	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Acceptable Acceptable Acceptable Unacceptable	3 3 3 4	Europe Use is in scope 2008 Distribution characterized by no statistics.			
Domain 3: Acces	ssibility/Clar Metric 6:	ity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	Determinatio	n*	High	1.3				
Extracted			Yes					
Parameter	Parameter			– EXTRACTION ———— Data				
Release Source: Environmental Media: Release or Emission Factor: Release Estimation Method: Release Days per Year:			demolition - breaking boards 50 percent is assumed to go to waste water and 50 percent to air. 90 g EPS-particles/tonne EPS taken from EU RAR 365					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	7. Chemical safety report: Hexa isposal; Insulation products in b	· ·		d all major diastereoisomers identified. posure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.		
Domain 3: Acces	sibility/Clar	itv					
2011(41) 0. 110000	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U	ncertainty					
Domain I. Varie	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	* n	High	1.3			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Release Source:			demolition - disposal of boards				
Disposal /Treatn	nent Method	:	30 percent of boards recycled, requiring manual deconstruction of the				
1 ,		structures. The remaining 70 percent of material was disposed of, and					
			these buildings were assumed not to be manually deconstructed.				
Environmental Media:			incineration				
Release or Emission Factor:			5E-06 release factor from incineration to WW or air				
Release Estimati	on Method:		taken from EU	RAR			
Release Days per	Year:		330				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}{=}\geq 1$  to < 1.7;  $\text{Medium} = \geq 1.7$  to < 2.4;  $\text{Low} = \geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa rocessing; formulation of EPS be			d all major diastereoisomers identified, Part 2. re or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relia	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
1	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into XPS compounding	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.	
Domain 3: Acces	ssibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality	Determinatio	»	High	1.6		
Extracted			Yes			
Parameter		EXTRACTION ————————————————————————————————————				
Release Source: Environmental Media: Release or Emission Factor: Release Estimation Method: Release Days per Year:			Waste-water from the reaction process wastewater 2 g per tonne of HBCDD used informtation from industry ?330 days			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa rocessing; formulation of EPS be			d all major diastereoisomers identified, Part 2. re or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into XPS compounding		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.6			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Release Source:			waste packaging contaminated with the substance, filters, filter dust and				
Disposal /Treatment Method:		off-spec product release of less than 0.001 percent of the flame retardant put into the incinerator					
Environmental Media: Release or Emission Factor:			incineration <0.5 percent of the HBCDD used to incineration				
Release Days per	Year:		?330  days				

If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa rocessing; formulation of EPS b	-		d all major diastereoisomers identified, Part 2. re or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into XPS compounding
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	ritv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Demain 4. Varial	bility and II	n containty			
Domain 4: Varial	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n*	High	1.6	
Extracted			Yes		
Parameter		- EXTRACTI Data	on —		
Environmental Media: Release or Emission Factor: Release Estimation Method: Release Days per Year:			landfill 1 g per tonne of informtation for ?330 days		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	ata Type Release; manufacturing; manufacturing; Completed Exposure or Risk Assessments;						
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Manufacturing not in scope but maybe can be applied to importation		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.6			
Extracted			Yes				
Parameter	Parameter			on —			
Release Estimation Method: Annual Release Quantity (kg/yr): Number of Sites:			Estimated - see table 3 $2 \text{ kg/yr (air)}$ ; <1 kg/y (WW) 1				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		9. Background document for he rocessing; Cutting of EPS board	-		and all major diastereoisomers identified. or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.4				
Extracted			Yes					
Parameter	Parameter			— EXTRACTION ————————————————————————————————————				
Release Source:	Release Source:			Cutting of EPS boards				
Environmental M	ſedia:		air					
Release or Emiss			100 g/tonnes HBCDD from cutting of boards					
Release Estimati			taken from EU RAR					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	0			and all major diastereoisomers identified. ted Exposure or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Access	sibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Variab	oility and U	ncertainty						
***************************************	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	eterminatic	n *	High	1.4				
Extracted	Extracted							
			- EXTRACTI	ON				
Parameter			Data	011				
Environmental M	Environmental Media:			air				
Release or Emissi	on Factor:		5 g XPS particlesper tonne XPS					
Release Estimation	on Method:		taken from EU	-				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	<u>e</u>	· ·		Release; Commercial Use; Insulation products in buildings; Completed Exposure or Risk Assessments; 3970750							
Domain		Metric	Rating	Score	Comments							
Domain 1: Reliab	oility											
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources							
Domain 2: Repre	sentative											
•	Metric 2:	Geographic Scope	Acceptable	3	Europe							
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).							
	Metric 4:	Temporal Representativeness	Acceptable	3	2008							
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.							
Domain 3: Access	sibility/Clar	itv										
Domain o. Treess	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.							
Domain 4: Variab	sility and III	naontaintri										
Domain 4. variai	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion							
	Metric 7.	Wietadata Completeness	Acceptable	<u></u>	Hillited discussion							
Overall Quality I	Determinatio	n*	High	1.4								
Extracted			Yes									
Parameter			— EXTRACTION ———— Data									
Release Source:	Delege Courses			service life of EPS and XPS boards at construction sites								
	Environmental Media:			air								
Release Estimation			measured									
Annual Release C		/vr):	70 kg/year									

If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,				and all major diastereoisomers identified. d Exposure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U:	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality I	Determinatio	n*	High	1.4		
Extracted			Yes			
			- EXTRACTION	ON		
Parameter			Data			
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater, surface water Estimated - see table 3 14 kg/y (air), 84 kg/y (WW), 10 kg/y (surface water)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Medium=\geq 1.7 \text{ to } < 1.7$ ;  $Medium=\geq 1.7$  to  $Medium=\geq 1.7$ 

Study Citation: Data Type Hero ID		9. Background document for he rocessing; EPS and HIPS formu			and all major diastereoisomers identified. sure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	EPS and HIPS compounding not in scope but may provide insight into XPS compounding		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Access	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	n*	High	1.7			
Extracted			Yes				
Parameter	Parameter			– EXTRACTION ———— Data			
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater Estimated - se 30 kg/y (air),	e table 3			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	9	· ·		and all major diastereoisomers identified. ed Exposure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	sibility/Clar	itv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Variab	oility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	* H	High	1.4	
Extracted			Yes		
			- EXTRACTION	ON	
Parameter			Data		
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):		air, wastewater Estimated - se 159 kg/y (air),	e table 3		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation: Data Type Hero ID	ata Type Release; Processing; XPS converting from beads to foam; Completed Exposure or Risk Assessments;							
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
-	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and U:	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	n*	High	1.4				
Extracted			Yes					
Parameter			- EXTRACTI Data	ON —				
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater Estimated - se 146 kg/y (air),	e table 3				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation: Data Type Hero ID	Data Type Release; Disposal; Insulation products in buildings; Reports for Data or Information Other than Exposure or Release							
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	oility							
	Metric 1:	Methodology	Acceptable	3	Not from trusted sources; however, Associated information does not indicate flaws or quality issues			
Domain 2: Repre	esentative							
-	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2014			
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	Unacceptable	4	report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial			A					
	Metric 7:	Metadata Completeness	Acceptable	3	Fully addresses variability and uncertainty			
Overall Quality I	Determinatio	n*	High	1.7				
Extracted			Yes					
Parameter	Parameter			— EXTRACTION ———— Data				
Release Source:			demolition - di	sposal o	f EPS boards			
Environmental M	Iedia:		incineration 90 g HBCD/tonne EPS boards					
Release or Emissi	ion Factor:							
Release Estimation	on Method:		proposed by in	dustry				
Annual Release C	Quantity (kg	/yr):	3.20 tonnes/yr (if 32,000 tonnes HBCDD are used)					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID					risation for hexabromocyclododecane. ction sites; Reports for Data or Information Other than Exposure or Release Data
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Not from trusted sources; however, Associated information does not indicate flaws or quality issues
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2014
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Cla	ritv			
	Metric 6:	Metadata Completeness	Unacceptable	4	report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varia	bility and U	ncertainty			
		Metadata Completeness	Acceptable	3	Fully addresses variability and uncertainty
Overall Quality l	Determinatio	on*	High	1.7	
Extracted			Yes		
			E2	XTRAC	CTION ———
Parameter			Data		
Environmental M	ledia:		unknown		
Release or Emiss			10 g HBCD/to	nne EP	S boards
Release Estimati			proposed by in		
Annual Release (		/vr):			00 tonnes HBCDD are used)

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}{=}\geq 1$  to < 1.7;  $\text{Medium} = \geq 1.7$  to < 2.4;  $\text{Low} = \geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	1	Flame Retardants, Association. isposal; HIPS; Reports for Data	v		
Domain		Metric	Rating	Score	Comments
Domain 1: Reliat	oility				
	Metric 1:	Methodology	Unacceptable	4	The data, data sources, and/or techniques used in the assessment or report are not specified.
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Belgium
	Metric 3:	Applicability	Unacceptable	4	disposal of this material is not in scope and this information does not seem applicable to in-scope scenarios
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	sibility/Clar	itv			
	Metric 6:	Metadata Completeness	Unacceptable	4	report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	sility and H	ncortainty			
Domain 4. varia	Metric 7:	Metadata Completeness	Unacceptable	4	does not address variability or uncertainty
Overall Quality I	Determinatio	n*	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTION Data	N	
Release Source: Environmental Media:		household waste 71 percent reused, recycled or composted; 27 percent is incinerated; <1 percent is landfilled			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	n: Duan, H., Yu, D., Zuo, J., Yang, B., Zhang, Y., Niu, Y 2016. Characterization of brominated flame retardants in construct and demolition waste components: HBCD and PBDEs. Science of the Total Environment.						
Data Type Hero ID		±			ta or Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Journal article		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	${\bf Unacceptable}$	4	China		
	Metric 3:	Applicability	Acceptable	3	disposal in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2016		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative		
Domain 3: Access	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	hility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	Fully addresses variability and uncertainty		
Overall Quality I	Determinatio	on*	High	1.2			
Extracted			Yes				
Parameter		_	- EXTRACTI Data	ON —			
Release Source:			sorting and cru	ushing			
Environmental M	ledia:		air	9			
Release or Emission Factor:			Original HBCD constituent in C&D waste is released into the atmosphere during these sorting and crushing operations, and is assumed to contribute 10 percent of the atmospheric emissions in the demolition process.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:					cterization of brominated flame retardants in construction
Data Type Hero ID		ition waste components: HBCD isposal; Insulation products in b			the Total Environment.  ta or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Journal article
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Unacceptable	4	China
	Metric 3:	Applicability	Acceptable	3	disposal in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized. Sample size is sufficiently representative
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	Fully addresses variability and uncertainty
Overall Quality I	Determinatio	on*	High	1.2	
Extracted			Yes		
			- EXTRACTION	ON	
Parameter			Data		
Release Source:		-	landfilling of fo	oam inst	ılation
Environmental M	Iedia:		landfill		
Release or Emiss	ion Factor:		7039.00 ?g/kg	of HBC	D found in foam in landfills

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			mical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster	
Data Type Hero ID	flame retar Release; P 3809277		eports for Data	or Infori	mation Other than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	EPS and HIPS compounding not in scope but may provide insight into XPS compounding	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	ssibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions. $$	
Domain 4: Varia	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	n*	High	1.6		
Extracted			Yes			
Parameter			- EXTRACTION - Data	ON —		
Release Source:			This is the emission factor for a generic site and was determined based on the 90th percentile of measurements of concentration in the effluent			
Environmental M	Media:		water	e sewer	treatment plants of 9 of the total of 13 sites.	
Release or Emiss			7.60E-06			
Release Estimati				08 EU as	ssessment (HERO 3970747)	
Release Days per			300		(/	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

-	J.S, E. P. lame retar		mical problem for	rmulati	on and initial assessment. Cyclic aliphatic bromide cluste		
Data Type I			eports for Data	or Inform	nation Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliabil	itv						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Represe	ntative						
*	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	EPS and HIPS compounding not in scope but may provide insight into XPS compounding		
N	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
1	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Aggesil	sility/Clan	;t <sub>**</sub>					
Domain 3: Accessit	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Variabil	ites and III	n containty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality De	terminatio	n*	High	1.6			
Extracted			Yes				
			- EXTRACTION	ON			
Parameter			Data				
Release Source:		This is the emission factor for a generic site and is equal to the maximum emission factor calculated from site-specific data that pertain to three processing steps including formulation of EPS and XPS compounds.					
Environmental Media:			air				
Release or Emission			air 7.60E-06				
Release Estimation				8 EU as	ssessment (HERO 3970747)		
Release Days per Y			300		(/		
Number of Sites:			13				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

-	J.S, E. P. lame retar		mical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluste		
Data Type F			eports for Data	or Inform	mation Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliabili	itv						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Represe	ntative						
*	Metric 2:	Geographic Scope	Acceptable	3	Australia		
Ŋ	Metric 3:	Applicability	Acceptable	3	EPS and HIPS compounding not in scope but may provide insight into XPS compounding		
I.	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
Ν	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.		
D:	:1:4 /01	••					
Domain 3: Accessib N	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Variabil	ity and III	naortainty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality Det	terminatio	n*	High	1.6			
Extracted			Yes				
			- EXTRACTION				
Parameter			Data				
Release Source:			sion factors for	handli 40 ?m tl	nable worst case values that are the sums of emis- ng and compounding solid flame retardants with hat are also of relatively high volatility as reported		
Environmental Med	lia:		water	,			
Release or Emissior	r Factor:		6.80E-03				
Release Estimation	Method:		taken from 201	2 Austr	ralian assessment (HERO 3978355)		
Release Days per Year:			150				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P. flame retar		mical problem fo	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster
Data Type Hero ID			eports for Data	or Infori	mation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments
Domain 2: Repres	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Australia
	Metric 3:	Applicability	Acceptable	3	EPS and HIPS compounding not in scope but may provide insight into XPS compounding
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.
Domain 2. Access	-:: -:: :+:/Closs	.;			
Domain 3: Access	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Variab	ility and II	nooutainty			
Domain 4. Variat	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality D	)eterminatio	on*	High	1.6	
Extracted			Yes		
			- EXTRACTION		
Parameter			Data		
Release Source:		These values are reasonable worst case values that are the sums of emission factors for handling and compounding solid flame retardants with particle sizes <40 ?m that are also of relatively high volatility as reported in OECD (2004b).			
Environmental M	edia:		air	.~;•	
Release or Emissi			2.50E-04		
Release Estimation			taken from 201	2 Austr	alian assessment (HERO 3978355)
Release Days per	Year:		150		,

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P. A 2015. TSCA Work Plan chemical problem formulation and initial assessment. Cyclic aliphatic bromide cluster							
Data Type Hero ID	flame retar Release; Pr 3809277		orts for Data or	Informa	tion Other than Exposure or Release Data;			
Domain		Metric	Rating	Score	Comments			
D 1 D !! I	"""							
Domain 1: Reliab	Metric 1:	Methodology	Acceptable	3	Previous risk assessments			
Domain 2: Repre	eentative							
Domain 2. Repre	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	$\overline{4}$	characterized by no statistics.			
Domain 3: Acces	aibility/Clan	:+						
Domain 5: Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and III	o containte						
Domain 4: varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	Determinatio	n*	High	1.3				
Extracted			Yes					
Parameter			- EXTRACTI Data	on —				
Release Source:	Release Source:		These are the emission factors for the generic site and are reported in OECD (2004b) as the emission factors for organic flame-retardants of relatively low volatility in partially open plastics conversion processes.					
Environmental M	Iedia:		water	·				
Release or Emissi	ion Factor:		3.00 E-05					
	Release Estimation Method: Release Days per Year:			08 EU as	ssessment (HERO 3970747)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}{=}\geq 1$  to < 1.7;  $\text{Medium} = \geq 1.7$  to < 2.4;  $\text{Low} = \geq 2.4$  to < 3.

Study Citation:			emical problem f	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster	
Data Type Hero ID	flame retar Release; P: 3809277		orts for Data or	Informa	tion Other than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments	
Domain 2: Repre	esentative					
*	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	itv				
Domain 9. Neces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	n*	High	1.3		
Extracted			Yes			
			- EXTRACTI	ON —		
Parameter			Data			
Release Source:		These are the emission factors for the generic site and are reported in OECD (2004b) as the emission factors for organic flame-retardants of relatively low volatility in partially open plastics conversion processes.				
Environmental M	ſedia:		air	10011103	in partially spon provides converted processes.	
Release or Emiss			3.00E-05			
Release Estimation			taken from 200	8 EU as	ssessment (HERO 3970747)	
Release Days per			300		/	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			mical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster		
Data Type Hero ID	flame retai Release; P. 3809277		orts for Data or	Informa	tion Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Australia		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rity					
20110111 01 110000	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and H	nacetainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on*	High	1.3			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Release Source:			These emission factors are weighted averages of emission factors for organic flame of relatively high volatility in closed plastics conversion processes that are reported in OECD (2004b). The emission factors that were averaged include values for high process temperature and low plastics production volume.				
Environmental M	Iedia:		water	. vorume	••		
Release or Emiss			1.60E-03				
Release Estimation	on Method:		taken from 201	l2 Austr	alian assessment (HERO 3978355)		
Release Days per	Year:		200		,		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:			emical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster		
Data Type Hero ID	flame retai Release; P. 3809277		orts for Data or	Informa	tion Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Australia		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and H	naortointy					
Domaii 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.3			
Extracted			Yes				
<b>D</b>		-	EXTRACTION	on —			
Parameter			Data				
Release Source:			These emission factors are weighted averages of emission factors for organic flame of relatively high volatility in closed plastics conversion processes that are reported in OECD (2004b). The emission factors that were averaged include values for high process temperature and low plastics production volume.				
Environmental M	Iedia:		air				
Release or Emiss			1.60E-03				
Release Estimation	on Method:		taken from 201	12 Austr	alian assessment (HERO 3978355)		
Release Days per	Year:		200		, , ,		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:			mical problem f	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster
	flame reta				
Data Type	,	rocessing; Compounding of Poly	styrene Resin to	Produc	e XPS Masterbatch; Reports for Data or Information Other than Exposure or Release Dat
Hero ID	3809277				
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces		=	A . 1.1		
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
D . 4 W	1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 · 1 ·				
Domain 4: Varia	-		A	2	
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determination	on <sup>*</sup>	High	1.3	
Extracted			Yes		
Extracted			168		
<b>T</b>			———	- EXT	RACTION ———
Parameter			Data		
Release Source:			This is the emi	ssion fac	tor for a generic site and is equal to the maximum
			of emission fac	ctors cal	culated from sitespecific data for three sites.
Environmental M	Iedia:		water		
Release or Emiss	ion Factor:		7.40E-06		
Release Estimation	on Method:		taken from 200	08 EU as	ssessment (HERO 3970747)
Release Days per	Year:		300		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7; Medium  $=\geq 1.7$  to < 2.4; Low  $=\geq 2.4$  to < 3.

•			mical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster
	flame retar		, D : (	D 1	VPCM : 1 (1 D / C D / IC C OI (1 E D ) D /
		rocessing; Compounding of Poly	styrene Kesın to	) Produc	e XPS Masterbatch; Reports for Data or Information Other than Exposure or Release Data
Hero ID	3809277				
Domain		Metric	Rating	Score	Comments
Domain 1: Reliabil	lity				
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments
Domain 2: Represe	entative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	$\frac{3}{4}$	characterized by no statistics.
	Wictire G.	Sample Size	Опассериали	<u> </u>	characterized by no statistics.
Domain 3: Accessi	bility/Clar	itx			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
					sessment methods, results, and assumptions.
Domain 4: Variabi	lity and H	neartainty			
	Metric 7:	-	Acceptable	3	The assessment addresses variability and uncertainty in the
	Menic i.	Metauata Completeness	vecehrane		results. Uncertainty is well characterized.
Overall Quality De	eterminatio	on <sup>*</sup>	High	1.3	
Extracted			Yes		
13AU GOLOG			100		
				- EXT	RACTION ———
Parameter			Data		
Release Source:			This is the emi	ssion fac	tor for a generic site and is equal to the maximum
					ated from site-specific data that pertain to three
					ling formulation of EPS and XPS compounds.
Environmental Me	dia:		air		•
Release or Emission	n Factor:		7.30E-06		
Release Estimation		taken from 200	08 EU as	ssessment (HERO 3970747)	
			300		
Release Days per Y	Year:		300		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P.	A 2015. TSCA Work Plan che	mical problem for	ormulati	ion and initial assessment. Cyclic aliphatic bromide cluster				
-	flame retai		-						
Data Type	Release; P	rocessing; Compounding of Poly	styrene Resin to	Produc	e XPS Masterbatch; Reports for Data or Information Other than Exposure or Release Data				
Hero ID	3809277								
Domain		Metric	Rating	Score	Comments				
D '. 1 D !'	1 '1''								
Domain 1: Relia	Metric 1:	Methodology	Acceptable	3	Previous risk assessments				
	Metric 1.	Wethodology	Acceptable	<del>- 0</del>	Frevious risk assessments				
Domain 2: Repre	esentative								
	Metric 2:	Geographic Scope	Acceptable	3	Canada				
	Metric 3:	Applicability	Acceptable	3	in scope				
	Metric 4:	Temporal Representativeness	Acceptable	3	2011				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
TD 1. 9 A	11 11 /CI	•,							
Domain 3: Acces	- 1	nty Metadata Completeness	Acceptable	3	A				
	Metric 6.	Metadata Completeness	Acceptable	J	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.				
Domain 4: Varia									
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.				
Overall Quality	Determination	on <sup>*</sup>	High	1.3					
Extracted			Yes						
				DVC	DD A CIDIONI				
Parameter			Data	— EXI	CRACTION ———				
100000000000000000000000000000000000000									
Release Source:					actor for a generic site and is the sum of emission				
					and compounding organic solid flame retardants				
					0 ?m that are of relatively medium volatility as				
Environment 1 N	Environmental Media:			reported in OECD (2004b).					
		water 6.60E-03	water						
					dian assessment				
Release Days per			60 or 200	i Cana	aran assessment				
200000 Dayo Po	1 20011		00 OI <b>2</b> 00						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7; Medium  $=\geq 1.7$  to < 2.4; Low  $=\geq 2.4$  to < 3.

Study Citation:	,		mical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster		
Data Type Hero ID	flame retai Release; P. 3809277		orts for Data or	Informat	tion Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Repre	esentative						
_	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and H	ncortainty					
Domaii 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on*	High	1.3			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Release Source:			These are the emission factors for the generic site and are equal to the maxima of the emission factors that were derived from site-specific data but were not explicitly reported. EPA calculated these factors, each of which is equal to the ratio of total annual releases from 13 sites for which site-specific data was not reported and the total annual processing rate				
Environmental M Release or Emiss	ion Factor:		for these sites. water 2.60E-05				
Release Days per	Year:		1				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:			emical problem f	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster		
Data Type Hero ID	flame retar Release; P 3809277		orts for Data or	Informat	tion Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Repre	esentative						
*	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Cla	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and H	ncortainty					
Domaii 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality	Determinatio	on*	High	1.3			
Extracted			Yes				
			- EXTRACTI	ON			
Parameter			Data				
Release Source:			These are the emission factors for the generic site and are equal to the maxima of the emission factors that were derived from site-specific data but were not explicitly reported. EPA calculated these factors, each of which is equal to the ratio of total annual releases from 13 sites for which site-specific data was not reported and the total annual processing rate for these sites.				
Environmental M	Iedia:		air				
Release or Emiss			5.80E-05				
Release Days per			300				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		mmary risk assessment report: ll; Completed Exposure or Risk		dodecan	e.		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	ability						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repr	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.		
Domain 3: Acce	ssibility/Clar Metric 6:	ity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	ability and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality	Determinatio	* on	High	1.7			
O votali specific	2700011111110010		111811				
Extracted			Yes				
Parameter		_	EXTRACTION ————————————————————————————————————				
Release Source:  Environmental Media: Release or Emission Factor:			Total EU 15 emissions of HBCDD. Most emissions (81 percent ) are estimated to come from the industrial of use of HBCDD in textile backcoating.  72 percent WW, 22 percent SW, 6 percent air  0.1 percent of PV				
Release Estimat Annual Release		/yr):	taken from 2008 EU assessment (HERO 3970747) 8.7 tonnes/yr				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:	,	1. Proposal for identification on cern: Proposal for identification			Cat 1 or 2, PBT, vPvB, or a substance of an equivalence as a SVHC			
Data Type Hero ID		ll; Completed Exposure or Risk		y ciodod.	counc as a syric.			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
*	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and H	naortainty						
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
	Wictire 1.	Wetadata Completeness	Песериане		minited discussion			
Overall Quality I	Determinatio	n*	High	1.7				
Extracted			Yes					
			- EXTRACTION	ON				
Parameter			Data					
Release Source:			Total EU 15 emissions of HBCDD. Most emissions (81 percent ) are estimated to come from the industrial of use of HBCDD in textile backcoating.					
Environmental M	Iedia:			V, 22 pe	rcent SW, 6 percent air			
Release or Emission Factor:			0.1 percent of PV					
Release Estimation	on Method:		taken from 2008 EU assessment (HERO 3970747)					
Annual Release C	Quantity (kg	/yr):	8.7  tonnes/yr					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Echa, 2009. Prioritisation and Annex XIV background information: hexbromocyclododecane. Release; manufacturing; manufacturing; Reports for Data or Information Other than Exposure or Release Data; 3970759								
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments				
Domain 2: Repre	esentative								
1	Metric 2:	Geographic Scope	Acceptable	3	Europe				
	Metric 3:	Applicability	Acceptable	3	Manufacturing not in scope but maybe can be applied to importation				
	Metric 4:	Temporal Representativeness	Acceptable	3	2008				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.				
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion				
	Welle 1.		Песериные		minited discussion				
Overall Quality I	Determination	»	High	1.7					
Extracted			Yes						
Parameter	Parameter			ON					
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air and wastew same as HERC 2 kg/yr (air); (	D ID 397					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		9. Prioritisation and Annex XIV ommercial Use; Insulation produ			n: hexbromocyclododecane. s for Data or Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.		
Domain 3: Access	sibility/Cla	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	n*	High	1.4			
Extracted			Yes				
			— EXTRAC	TION			
Parameter			Data				
Release Source:			service life of F	EPS and	XPS boards at construction sites		
Environmental M	ledia:		air				
Release Estimation	on Method:		same as HERO ID 3970751				
Annual Release C		(/yr):	70 kg/year				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	9. Prioritisation and Annex XIV rocessing; XPS Compounding /	_		on: hexbromocyclododecane. or Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	bility				
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Cla	$\operatorname{rity}$			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determination	» N	High	1.4	
Extracted			Yes		
			— EXTRACT	ION —	
Parameter			Data		
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater same as HERC 14 kg/y (air), 8	ID 397	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		Echa, 2009. Prioritisation and Annex XIV background information: hexbromocyclododecane. Release; Processing; EPS and HIPS formulation; Reports for Data or Information Other than Exposure or Release Data; 3970759								
Domain		Metric	Rating	Score	Comments					
Domain 1: Relial	bility									
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments					
Domain 2: Repre	esentative									
	Metric 2:	Geographic Scope	Acceptable	3	Europe					
	Metric 3:	Applicability	Acceptable	3	EPS and HIPS compounding not in scope but may provide insight into XPS compounding					
	Metric 4:	Temporal Representativeness	Acceptable	3	2008					
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.					
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.					
Domain 4: Varial	bility and U	ncertainty								
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion					
Overall Quality I	Determinatio	*	High	1.7						
Extracted			Yes							
Parameter			– EXTRACTI Data	ON —						
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater, surface water same as HERO ID 3970753 30 kg/y (air), 75 kg/y (WW), 330 kg/y (surface water)							

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	99. Prioritisation and Annex XIV rocessing; EPS converting from	_		on: hexbromocyclododecane.  for Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments
Domain 2: Repre	esentative				
-	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Cla Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, as-
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	sessment methods, results, and assumptions.
Overall Quality I	Determination	DII,	High	1.4	
Extracted			Yes		
			— EXTRACT	TION -	
Parameter			Data		
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater same as HERC 159 kg/y (air),	D 397	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,	9. Prioritisation and Annex XIV rocessing; XPS converting from	0		n: hexbromocyclododecane. for Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Previous risk assessments
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	»	High	1.4	
Extracted			Yes		
			— EXTRACT	TION -	
Parameter			Data		
Environmental Media: Release Estimation Method: Annual Release Quantity (kg/yr):			air, wastewater same as HERC 146 kg/y (air),	D 397	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation: Data Type Hero ID		European Flame Retardants, Association. 2013. Fireaway! the EFRA newsletter, Part 2. Release; Disposal; Disposal of packaging; Reports for Data or Information Other than Exposure or Release Data; 3981171							
Domain		Metric	Rating	Score	Comments				
Domain 1: Reliab	oility								
	Metric 1:	Methodology	Unacceptable	4	The data, data sources, and/or techniques used in the assessment or report are not specified.				
Domain 2: Repre	esentative								
	Metric 2:	Geographic Scope	Acceptable	3	Belgium				
	Metric 3:	Applicability	Unacceptable	4	disposal of this material is not in scope and this information does not seem applicable to in-scope scenarios				
	Metric 4:	Temporal Representativeness	Acceptable	3	2010-2014				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
Domain 3: Acces	sibility/Clar	rity							
	Metric 6:	Metadata Completeness	Unacceptable	4	provides results, but the underlying methods, data sources, and assumptions are not fully transparent.				
Domain 4: Varial	bility and U	ncertainty							
	Metric 7:	Metadata Completeness	Unacceptable	4	does not address variability or uncertainty				
Overall Quality I	Determinatio	n*	Unacceptable	4.0					
Extracted			Yes						
Parameter			- EXTRACTION Data	ON —					
Environmental M	Iedia:		97 percent was	inciner	ated while 3 percent went to controlled landfill				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}{=}\geq 1$  to < 1.7;  $\text{Medium} = \geq 1.7$  to < 2.4;  $\text{Low} = \geq 2.4$  to < 3.

Study Citation:	-	Flame Retardants, Association.						
Data Type Hero ID	Release; D 3981171	usposal / Recycle; Waste of Elec	tric and Electroi	nic Equi	pment (WEEE); Reports for Data or Information Other than Exposure or Release Data;			
Hero ID	9901111							
Domain	*******************************	Metric	Rating	Score	Comments			
Domain 1: Relia	kility.							
Domain 1. Rena	Metric 1:	Methodology	Unacceptable	4	The data, data sources, and/or techniques used in the assess-			
	Metric 1.	Methodology	Chacceptable	- <del>t</del>	ment or report are not specified.			
Domain 2: Repre	aantativa							
Domain 2. Repre	Metric 2:	Geographic Scope	Acceptable	3	Belgium			
	Metric 3:	Applicability	Unacceptable	4	disposal of this material is not in scope and this information			
		11ppinedoline)	ondosep tubio	-	does not seem applicable to in-scope scenarios			
	Metric 4:	Temporal Representativeness	Acceptable	3	2010-2014			
-	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	oibility/Clas							
Domain 5: Acces		Metadata Completeness	Unacceptable	4	provides results, but the underlying methods, data sources,			
	Metric o.	Metadata Completeness	Chacceptable		and assumptions are not fully transparent.			
Domain 4: Varia	bility and H	naartainty						
Domain 4. vana	·	Metadata Completeness	Unacceptable	4	does not address variability or uncertainty			
		Michaella Comprehensis	Спассернаме		does not address variabling of uncertainty			
Overall Quality 1	Determinatio	on*	Unacceptable	4.0				
Extracted			Yes					
				EXTR	ACTION —			
Parameter			Data					
Disposal /Treatn	Disposal /Treatment Method:			12wt percent of collected WEEE plastics and almost no FR plastics				
± /					were recycled in 2010			
Annual Release (	Quantity (kg	g/yr):	700,000  tons/y	r of ann	nual waste WEEE is expected to contain FRs			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:					2013. Determination of PBDEs, HBB, PBEB, DBDPE								
Data Type Hero ID		3BPA and related compounds in ll; Wastewater treatment sludge			talonia (Spain). Science of the Total Environment.  Data;								
Domain		Metric	Rating	Score	Comments								
Domain 1: Relial	oility												
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources								
Domain 2: Repre	esentative												
	Metric 2:	Geographic Scope	Acceptable	3	Spain								
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope								
	Metric 4:	Temporal Representativeness	Acceptable	3	2013								
	Metric 5:	Sample Size	Acceptable	3	Sample size provided with some statitistical information such as recovery percent and relative standard deviation								
Domain 3: Acces	sibility/Clar	ritv											
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited								
Domain 4: Varial	bility and U	ncertainty											
	Metric 7:	Metadata Completeness	Unacceptable	4	The report does not address variability or uncertainty with respect to this data element.								
Overall Quality I	Determinatio	n*	High	1.7									
Extracted			Yes										
			- EXTRACTI	ON —									
Parameter			Data										
Release Source:					aerobic digestion and activated sludge								
Disposal /Treatment Method:			Sewage sludge to soil application, compost, dump, thermal drying, agrar-										
Environmental Media: Release or Emission Factor: Release Estimation Method:			ian, or dehydration. water, land, incineration 5.17 - 97.5 ng/g dry weight (dw) (mean - 19.3 ng/g dw) Measured										
										·/vr)·	0.757  kg/yr		
								Annual Release Quantity (kg/yr): Number of Sites:			0.757 kg/yr 17		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	,	· · · · · · · · · · · · · · · · · · ·	Tomko, G.,McDonald, K. M 2013. Environmental fate of hexabromocyclododecane from a new Canadian electronic recycling facility. Journal of Environmental Management.							
Data Type Hero ID				onic Eq	nipment (WEEE); Published Models for Exposures or Releases:					
Domain		Metric	Rating	Score	Comments					
Domain 1: Relial	bility									
	Metric 1:	Methodology	Acceptable	3	scientifically sound; no errors found					
Domain 2: Repre	esentative									
-	Metric 2:	Geographic Scope	Acceptable	3	Canada					
	Metric 3:	Applicability	Unacceptable	4	Out of scope					
	Metric 4:	Temporal Representativeness	Acceptable	3	2013					
	Metric 5:	Sample Size	N/A	N/A	Parameter is not applicable to models					
Domain 3: Acces	sibility/Clar	ritv								
	Metric 6:	Metadata Completeness	Acceptable	3	Model approach, equations, and choice of parameter values are transparent and clear					
Domain 4: Varia	bility and U	ncertainty								
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion					
Overall Quality l	Determination	on <sup>*</sup>	Unacceptable	4.0						
Extracted			Yes							
			— EXTRAC	TION -						
Parameter			Data							
Release Source:		( )	Releases from canadian recycling facility							
Annual Release (	Quantity (kg	g/yr):	Annual releases in Table 2							

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	Bsef,. 2009. HBCD hexabromocyclododecane fact sheet. Release; manufacturing; manufacturing; Reports for Data or Information Other than Exposure or Release Data; 3981179								
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	bility Metric 1:	Methodology	Acceptable	3	Sources arent necessarily trusted but do not seem flawed				
	1,100110 11		Treespeasie		Sources aren't necessarily tradeed but do not even haved				
Domain 2: Repre									
	Metric 2:	Geographic Scope	Acceptable	3	US				
	Metric 3:	Applicability	Unacceptable	4	Out of scope and not applicable to in scope				
	Metric 4:	Temporal Representativeness	Acceptable	3	2009				
	Metric 5:	Sample Size	N/A	N/A	This metric is not applicable to this data type				
Domain 3: Acces	sibility/Clar								
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.				
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Unacceptable	4	The report does not address variability or uncertainty				
Overall Quality I	Determinatio	n*	Unacceptable	4.0					
Extracted			Yes						
Parameter			- EXTRACTI Data	ON					
Number of Sites: Waste Treatment		advanced wast	ewater and bio	production process is treated at the plant by an treatment facility including filtration, active carmembrane reactor, resulting in effluents that can					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:					ase of hexabromocyclododecane (HBCD) and Nano- and			
Data Type Hero ID	-	cles from thermal cutting of pol rocessing; XPS Thermal Cutting			mental Science and Technology. or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
*	Metric 2:	Geographic Scope	Acceptable	3	Switzerland			
	Metric 3:	Applicability	Acceptable	3	in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2012			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited			
Domain 4: Varial	hility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n N	High	1.6				
Extracted			Yes					
			- EXTRACTI	on —				
Parameter			Data					
Release Source:			Thermal cutting	ng opera	tion modeled in a closed sampling system			
Disposal /Treatment Method:			Particulate (dust)					
Environmental Media:			Release rate per hour during the thermal cutting operation					
Release or Emission Factor:			4.0E12 particles per hour released or 160.4 ug HBCD per hour released					
Release Estimation		Measured						
Daily Release Qu	lay):	1.2832E-06						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:					ase of hexabromocyclododecane (HBCD) and Nano- and				
Data Type Hero ID	microparticles from thermal cutting of polystyrene foams. Environmental Science and Technology. Release; Processing; EPS Thermal Cutting; Completed Exposure or Risk Assessments; 1927576								
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Acceptable	3	Switzerland				
	Metric 3:	Applicability	Acceptable	3	in scope				
	Metric 4:	Temporal Representativeness	Acceptable	3	2012				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
Domain 3: Acces	sibility/Clar	ritv							
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited				
Domain 4: Varial	hility and U	ncertainty							
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determinatio	» n	High	1.6					
Extracted			Yes						
			- EXTRACTI	ON					
Parameter			Data	011					
Release Source:	Release Source:			Thermal cutting operation modeled in a closed sampling system					
Disposal /Treatment Method:			Particulate (dust)						
Environmental Media:			Release rate per hour during the thermal cutting operation						
Release or Emission Factor:			5.0E12 particles per hour released or 249.1 ug HBCD per hour released						
Release Estimation	Release Estimation Method:				0 1				
Daily Release Qu	antity (kg/c	lay):	1.9928E-06						
<i>v</i>	v ( 8/ ·	· /	-						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	European application		2015. Keeping t	fire in cl	neck an introduction to flame retardants used in transport	
Data Type Hero ID		ll; Unknown; Reports for Data o	or Information O	ther tha	an Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	From industry survey	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	Unknown, but cites sources as recent as 2013	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	oility and U	ncertaintv				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	)eterminatio	*	Medium	1.9		
Extracted			Yes			
			- EXTRACTION	ON		
Parameter			Data			
Environmental Media: Release or Emission Factor:		water, air 1.5 grams/ton HBCD (water); 47.3 grams/ton HBCD (air) (2013)				
Release Estimation	on Method:		Estimated via			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3$ .

Study Citation:	areas and	industrial areas in South China			pmocyclododecanes in surface soils from E-waste recycling reoisomer- and enantiomer-specific profiles, and inventory.		
Data Type Hero ID		ntal Science and Technology. isposal; Disposal of Waste of Ele	ectric and Electr	onic Eq	uipment (WEEE); Environmental Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Release rate is an estimate for entire lifecycle		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Unacceptable	4	China		
	Metric 3:	Applicability	Unacceptable	4	Out of scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2011		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized.		
Domain 3: Acces	cibility/Clan	; <sub>+</sub>					
Domain 5. Acces	Metric 6:	Metadata Completeness	Unacceptable	4	Release data do not include any needed metadata to understand what the data represent and are not usable in the risk evaluation		
Domain 4: Varia	bility and Un Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	Unacceptable	4.0			
Extracted			Yes				
Parameter			– EXTRACTION ————————————————————————————————————				
Release Source: Annual Release Quantity (kg/yr):			The mean concentrations of total HBCDs in the surface soils ranged from 0.22 to 0.79 and from 0.31 to 9.99 ng/g dw for two surrounding e-waste recycling sites and industrial areas. estimates of 3.42 kg and 1.84 tonnes for the e-waste recycling areas and industrial areas (these areas include electronics, textiles, and building materials)				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}{=}\geq 1$  to < 1.7;  $\text{Medium} = \geq 1.7$  to < 2.4;  $\text{Low} = \geq 2.4$  to < 3.

Study Citation:	and electro	onic equipment: substance flows	in a recycling pl	ant. En	M 2005. Brominated flame retardants in waste electrical vironmental Science and Technology.
Data Type Hero ID	Release; D 1927802	isposal; Disposal of Waste of Ele	ectric and Electr	onic Eq	uipment (WEEE); Environmental Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Should represent loss if WEEE is entirely disposed of
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Switzerland
	Metric 3:	Applicability	Unacceptable	4	Out of scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2005
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	data include all associated metadata,
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	» n	Unacceptable	4.0	
Extracted	***************************************		Yes		
Parameter		_	– EXTRACTI Data	ON —	
Release Source: Release or Emiss	Release Source: Release or Emission Factor:			of HBC kg WEI	D in WEEE EE

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation:	Study Citation: Stubbings, W. A., Harrad, S 2014. Extent and mechanisms of brominated flame retardant emissions frings and fabrics: A critical review. Environment International.						
Data Type Hero ID	_	abrics: A critical review. Environisposal; waste textiltes; Environ					
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Only represents air release from waste textiles		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	UK		
	Metric 3:	Applicability	Unacceptable	4	Out of scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2014		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized.		
Domain 3: Acces	sibility/Clar	itv					
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	data include all associated metadata,		
Domain 4: Varia	bility and U	ncertaintv					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	* on	Unacceptable	4.0			
Extracted			Yes				
			- EXTRACTION	ON			
Parameter			Data				
Release Source:			emissions from	waste t	extiles		
Environmental M	Iedia:		air				
Release or Emission Factor:			200-3000 mg HBCD/m2 textile-hour				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	_	· · · · · · · · · · · · · · · · · · ·		K.,Brors	ström-Lundén, E 2004. The environmental occurrence of		
Data Type Hero ID		ocyclododecane in Sweden. Cher se; XPS Foam; Monitoring Data	-				
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Data from trusted source		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Sweden		
	Metric 3:	Applicability	Unacceptable	4	Information related to in-scope scenario but not to engineering assessment $% \left( 1\right) =\left( 1\right) \left( 1\right)$		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and H	ncortainty					
	-	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determination	)n*	Unacceptable	4.0			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Release Source:			Samples were taked 300-700 meters from a Swedish textile factory that manufactures XPS treated with HBCD two weeks per year				
Environmental M	Iedia:		Water, Air, La		Por your		
Release or Emiss					140 to 1,300 ug/kg dry weight		
Release Estimati			Concentration				
Number of Sites:			1				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:				K.,Bror	ström-Lundén, E 2004. The environmental occurrence of		
Data Type Hero ID		ocyclododecane in Sweden. Cher isposal; Landfill; Monitoring Da	-				
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Data from trusted source		
Domain 2: Repres	sentative						
-	Metric 2:	Geographic Scope	Acceptable	3	Sweden		
	Metric 3:	Applicability	Unacceptable	4	Information related to in-scope scenario but not to engineering assessment $% \left( 1\right) =\left( 1\right) \left( 1\right)$		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.		
Domain 3: Access		-					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Variab	sility and H	naartainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality D	Determinatio	n*	Unacceptable	4.0			
Extracted			Yes				
			- EXTRACTI	ON			
Parameter			Data				
Release Source:			Samples of the	air, lan	dfill leachate, and sediment were taked		
Disposal /Treatment Method:			landfill				
Environmental Media:			Water, Air, Land				
Release or Emissi	on Factor:		Air - 0.013 to 0.18 ng/m3 Water - 3 to 9 ng/LSediment - $<$ 0.1 ug/kg dry weight				
Release Estimation	n Method:			in the s	ediment, water, and air		
Number of Sites:	.1. 1.10011041		1	111 0110 0	wasteney woody was was		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		r, M.,Sternbeck, J.,Palm, A.,Kaj ocyclododecane in Sweden. Cher		K.,Bror	ström-Lundén, E 2004. The environmental occurrence of		
Data Type Hero ID		se; Textile industry; Monitoring	-				
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Data from trusted source		
Domain 2: Repre	sentative						
Domain 2. Teepre	Metric 2:	Geographic Scope	Acceptable	3	Sweden		
	Metric 3:	Applicability	Unacceptable	4	Information related to out-of-scope scenario and not to engineering assessment		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rit v					
Domain 6. Neces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Daniel A. Vaniel	L:1:4 J TT						
Domain 4: Varial	Metric 7:	ncertainty Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	»	Unacceptable	4.0			
Extracted			Yes				
			- EXTRACTI	ON			
Parameter			Data				
Release Source:			Fish samples were taken up stream and down stream from a Swedish textile facility. Air samples were take 350 meters from the facility. Surface sediment samples were taked along the river (both upstream and downstream of the facility)				
Environmental Media:		Water, Air, Land					
Release or Emission Factor:		Air - 0.019 to 0.74 ng/m3 Water - 31 ng/LSediment - <0.1 to 25 ug/kg dry weightFish - 65 to 1,800 ug/kg dry weightSewage sludge - 30 to 33					
Release Estimation	on Method:		ug/kg dry weig Concentration	-	ediment, water, air, and sewage sludge		
Number of Sites:			1	0110 0	, moor, and some some		
		(	Continued on nex	t page			
				r8~			

## - continued from previous page

Study Citation:	Remberger, M., Sternbeck, J., Palm, A., Kaj, L., Strömberg, K., Brorström-Lundén, E. 2004. The environmental occurrence of hexabromocyclododecane in Sweden. Chemosphere.						
Data Type Hero ID	Release; Use; Textile indust 1927826	ry; Monitoring Da	ata;				
Domain	Met	ric	Rating	Score	Comments		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:					A review of chamber experiments for determining specific
Data Type Hero ID					dants. Atmospheric Environment. Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	UK
	Metric 3:	Applicability	Acceptable	3	Potentially can be applied to occupational scenario (use of insulation in offices).
	Metric 4:	Temporal Representativeness	Acceptable	3	2013
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.6	
Extracted			Yes		
			- EXTRACTION	ONI	
Parameter			Data	O14	
Release Source:			Insulation boar lein et al., 2003		as modeled in a chamber in another study (Kemm-
Release or Emiss	ion Factor:		0.0004 to 0.002	/	2h

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		rene Foams and the Associated I			mposition of Nanoparticles Released from Thermal Cutting mocyclododecane (HBCD) Diastereomers. Aerosol and Air
Data Type Hero ID	Release; P: 2674624	rocessing; EPS Thermal Cutting	g; Completed Ex	posure o	or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Switzerland
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario
	Metric 4:	Temporal Representativeness	Acceptable	3	2013
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	itv			
Domain o. Troop	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
Doment I. Verre	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	on*	High	1.6	
Extracted			Yes		
Parameter			- EXTRACTI Data	ON —	
Release Source:			From 1 hour lo	ng expe	eriments cutting EPS foam
Release or Emiss	ion Factor:		5.2 mg particle	s contai	ning 160 ug HBCD per hour
Release Estimation	on Method:		measured		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		rene Foams and the Associated I			mposition of Nanoparticles Released from Thermal Cutting mocyclododecane (HBCD) Diastereomers. Aerosol and Air
Data Type Hero ID	Release; P 2674624	rocessing; XPS Thermal Cutting	g; Completed Ex	posure o	or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Switzerland
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario
	Metric 4:	Temporal Representativeness	Acceptable	3	2013
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	itv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	n*	High	1.6	
Extracted			Yes		
Parameter			- EXTRACTI Data	ON —	
Release Source:			From 1 hour lo	ng expe	eriments cutting XPS foam
Release or Emiss	ion Factor:				ining 250 ug HBCD per hour
Release Estimation			measured		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Rauert, C., Lazarov, B., Harrad, S., Covaci, A., Stranger, M. 2014. A review of chamber experiments for determination rates and investigating migration pathways of flame retardants. Atmospheric Environment.					
Data Type Hero ID		9 9 9			Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
*	Metric 2:	Geographic Scope	Acceptable	3	UK
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in offices).
	Metric 4:	Temporal Representativeness	Acceptable	3	2013
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	*	High	1.6	
Overall Quality 1	<u> </u>	,,,,	111511	1.0	
Extracted			Yes		
			- EXTRACTION	ON	
Parameter			Data		
Release Source:		·	Emission test	in chaml	oer.
Environmental M	Iedia:		Offices		
Release or Emissi	ion Factor:		300  ng/g HBC	D in du	st

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:		Rauert, C., Lazarov, B., Harrad, S., Covaci, A., Stranger, M 2014. A review of chamber experiments for determining specific emission rates and investigating migration pathways of flame retardants. Atmospheric Environment.						
Data Type Hero ID		Release; Consumer Use; Insulation in homes; Reports for Data or Information Other than Exposure or Release Data;						
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
-	Metric 2:	Geographic Scope	Acceptable	3	UK			
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (in homes). No associated workers.			
	Metric 4:	Temporal Representativeness	Acceptable	3	2013			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	itv						
Domain o. Trees.	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	hility and H	neartainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n"	Unacceptable	4.0				
Extracted			Yes					
			- EXTRACTI	ON				
Parameter			Data					
Release Source:		Emission test	in chaml	ber				
Environmental Media:			Houses					
Release or Emissi	ion Factor:		100 ng/g HBCD in dust					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:  Data Type Hero ID	Rauert, C., Lazarov, B., Harrad, S., Covaci, A., Stranger, M 2014. A review of chamber experiments for determining specific emission rates and investigating migration pathways of flame retardants. Atmospheric Environment.  Release; Consumer Use; Insulation in homes; Reports for Data or Information Other than Exposure or Release Data; 2343745						
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	hility						
Domain 1. Teenas	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	UK		
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (in homes). No associated workers.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2013		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
					sessment methods, results, and assumptions.		
Domain 4: Varial	-			4			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	* on	Unacceptable	4.0			
Extracted	*************************************		Yes				
Parameter		- EXTRACTI Data	ON —				
Release Source: Environmental Media: Release or Emission Factor:		Emission test in chamber Near electronic equipment (5 meters from TV) 5,700 to 24,000 ng/g HBCD in dust					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:	of Polystyr	Kuo, Y. uY, Zhang, H., Gerecke, A. C., Wang, J. 2014. Chemical Composition of Nanoparticles Released from Thermal Cutting of Polystyrene Foams and the Associated Isomerization of Hexabromocyclododecane (HBCD) Diastereomers. Aerosol and Air Quality Research.						
Data Type Hero ID	Release; P 2674624	Release; Processing; EPS Thermal Cutting; Completed Exposure or Risk Assessments; 2674624						
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	Switzerland			
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario			
	Metric 4:	Temporal Representativeness	Acceptable	3	2013			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	ssibility/Clar	ritv						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n*	High	1.6				
Extracted			Yes					
Parameter		EXTRACTION ————————————————————————————————————						
Release Source: Release or Emission Factor: Release Estimation Method:			15 - 40  mg/g f	or specif	eriments cutting EPS foam fied particle size range was the highest concentrations for these size par-			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:	Kuo, Y. uY, Zhang, H., Gerecke, A. C., Wang, J. 2014. Chemical Composition of Nanoparticles Released from Thermal Cutting of Polystyrene Foams and the Associated Isomerization of Hexabromocyclododecane (HBCD) Diastereomers. Aerosol and Air Quality Research.								
Data Type Hero ID	Release; P: 2674624	rocessing; XPS Thermal Cutting	rmal Cutting; Completed Exposure or Risk Assessments;						
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
•	Metric 2:	Geographic Scope	Acceptable	3	Switzerland				
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario				
	Metric 4:	Temporal Representativeness	Acceptable	3	2013				
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.				
Damain 2. Acces	aibility /Class	:4							
Domain 3: Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.				
Domain 4: Varial	bility and U	ncertainty							
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determinatio	$\operatorname{n}^*$	High	1.6					
Extracted			Yes						
Parameter			– EXTRACTION ———— Data						
Release Source: Release or Emission Factor: Release Estimation Method:			20 - $60  mg HB$	CD/g p	eriments cutting XPS foam particle generated, for specified particle size range was the highest concentrations for these size par-				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:	: Ni, H. G., Lu, S. Y., Mo, T., Zeng, H 2016. Brominated flame retardant emissions from the open burning of five plastic vand implications for environmental exposure in China. Environmental Pollution.						
Data Type Hero ID	_	ations for environmental exposu isposal; Incineration of plastic w					
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
*	Metric 2:	Geographic Scope	Unacceptable	4	China		
	Metric 3:	Applicability	Acceptable	3	disposal in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2016		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized.		
Domain 3: Acces	sibility/Clar	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	data include all associated metadata,		
Domain 4: Varial	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.4			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Release Source:			Two incinerati	on plant	ts in China		
Disposal /Treatm	nent Method	l:	airborne partic	le (51 pe	ercent), followed by residualash (44 percent) and		
Engineer and Madin			the gas phase (5.1 percent );				
Environmental Media: Release or Emission Factor:			air airborne particle - $26.8$ to $5{,}290$ ng HBCD/g plastic wasteresidual ash -				
release or rimiss	ion ractor:				g plastic wastegas phase - 10.2 to 17.1 ng HBCD/g		
			plastic waste	лось/ в	5 phasile wastegas phase - 10.2 to 11.1 ng HDCD/g		
Release Estimation	on Method:		Measured				
		·/vr)·	25.5  kg/yr				
		13 2 1.					
Annual Release Quantity (kg/yr): Number of Sites:			2				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:	: Ni, H. G., Lu, S. Y., Mo, T., Zeng, H 2016. Brominated flame retardant emissions from the open burning of five plastic vand implications for environmental exposure in China. Environmental Pollution.						
Data Type Hero ID	_	ations for environmental exposu isposal; Incineration of plastic w					
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Unacceptable	4	China		
	Metric 3:	Applicability	Acceptable	3	disposal in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2016		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution of samples is fully characterized.		
Domain 3: Acces	sibility/Clar	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	data include all associated metadata,		
Domain 4: Varia	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on"	High	1.4			
Extracted			Yes				
Parameter			– EXTRACTION ————————————————————————————————————				
Release Source:			Two incinerati	on plant	s in China		
Disposal /Treatn	nent Method	:	Two incineration plants in China airborne particle (51 percent), followed by residualash (44 percent) and				
			the gas phase (5.1 percent );				
Environmental Media:			land				
Release or Emission Factor:			airborne particle - 26.8 to 5,290 ng HBCD/g plastic wasteresidual ash - 4.9 to 77.1 ng HBCD/g plastic wastegas phase - 10.2 to 17.1 ng HBCD/g				
Release Estimation	on Mother J.		plastic waste Measured				
		/vr).					
Annual Release Quantity (kg/yr): Number of Sites:			$71.7  \mathrm{kg/yr}$				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:		Li, L., Weber, R., Liu, J., Hu, J 2016. Long-term emissions of hexabromocyclododecane as a chemical of concern in products in China. Environment International.							
Data Type Hero ID	Release; Manufacturing; HBCD production; Reports for Data or Information Other than Exposure or Release Data; 3350476								
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Information compiled from several different sources				
Domain 2: Repre	esentative								
	Metric 2:	Geographic Scope	Unacceptable	4	China				
	Metric 3:	Applicability	Acceptable	3	Manufacturing not in scope but maybe can be applied to importation				
	Metric 4:	Temporal Representativeness	Acceptable	3	2016				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
Domain 3: Acces	sibility/Clar	itv							
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.				
Domain 4: Varia	bility and U	ncertainty							
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determinatio	* on	Medium	2.1					
Extracted			Yes						
Parameter		- EXTRACTION Data	ON —						
Release Source:			All releases were modeled from previous risk assessments, reports, and China's HBCD industry data						
Release or Emiss	ion Factor:		3.30E-07	muusti	y cara				

If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:		Li, L., Weber, R., Liu, J., Hu, J 2016. Long-term emissions of hexabromocyclododecane as a chemical of concern in products in China. Environment International.						
Data Type Hero ID			orts for Data or Information Other than Exposure or Release Data;					
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	oility							
	Metric 1:	Methodology	Acceptable	3	Information compiled from several different sources			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Unacceptable	4	China			
	Metric 3:	Applicability	Acceptable	3	in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2016			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Claı	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	»	Medium	1.9				
Extracted			Yes					
			- EXTRACTION	ON —				
Parameter		Data						
Release Source:		All releases were modeled from previous risk assessments, reports, and China's HBCD industry data						
Release or Emission Factor:			5.2E-6 to 3.3E-	-5				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			g-term emissions	of hexa	abromocyclododecane as a chemical of concern in products		
Data Type Hero ID	in China. Environment International. Release; Processing; XPS Foam; Reports for Data or Information Other than Exposure or Release Data; 3350476						
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information compiled from several different sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Unacceptable	4	China		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2016		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.		
Domain 4: Varia	bility and U:	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	» Dn	Medium	1.9			
Extracted			Yes				
			- EXTRACTION	ON —			
Parameter	Parameter		Data				
Release Source:		All releases were modeled from previous risk assessments, reports, and China's HBCD industry data					
Release or Emiss	ion Factor:		China's HBCD industry data 6.9E-6 to 1.7E-5				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		oer, R.,Liu, J.,Hu, J 2016. Lon Environment International.	g-term emissions	of hexa	abromocyclododecane as a chemical of concern in products	
Data Type Hero ID	Release; Processing; Textiles; Reports for Data or Information Other than Exposure or Release Data; 3350476					
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information compiled from several different sources	
Domain 2: Repre	esentative					
*	Metric 2:	Geographic Scope	Unacceptable	4	China	
	Metric 3:	Applicability	Unacceptable	4	Out of scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2016	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Cla	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.	
Domain 4: Varia	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0		
Extracted		Yes				
		- EXTRACTION	ON —			
Parameter		Data				
Release Source:		All releases were modeled from previous risk assessments, reports, and China's HBCD industry data				
Release or Emission Factor:		7.0E-6 to 7.3E-6				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		per, R.,Liu, J.,Hu, J., 2016. Lon, Environment International.	g-term emissions	of hexa	abromocyclododecane as a chemical of concern in products			
Data Type Hero ID		Release; Consumer Use; EPS, XPS, or textiles; Reports for Data or Information Other than Exposure or Release Data;						
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Information compiled from several different sources			
Domain 2: Repre	esentative							
•	Metric 2:	Geographic Scope	Unacceptable	4	China			
	Metric 3:	Applicability	Unacceptable	4	Out of scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2016			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	on"	Unacceptable	4.0				
Extracted			Yes					
Parameter			- EXTRACTION Data	ON —				
Release Source:			All releases were modeled from previous risk assessments, reports, and					
Release or Emiss	ion Factor:		China's HBCD 5.8E-8 to 1.4E-		y data			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			g-term emissions	s of hexa	abromocyclododecane as a chemical of concern in products
Data Type		Environment International. Disposal; Demolition, recycling, la	andfill, or incine	ration o	of products containing HBCD; Reports for Data or Information Other than Exposure or Rele
Hero ID	3350476				<u></u>
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information compiled from several different sources
Domain 2: Repre	sentative				
1	Metric 2:	Geographic Scope	Unacceptable	4	China
	Metric 3:	Applicability	Acceptable	3	in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Unacceptable		characterized by no statistics.
		-			•
Domain 3: Access	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.
Domain 4: Varial	bility and Ur	ncortainty			
Domain 4. varas		Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
	IVICOITO	Withdrawa Completeness	Chacoptant		NO discussion of variability of discertainty
Overall Quality I	)eter <u>minatic</u>	on*	Medium	1.9	
Extracted			Yes		
				т	EXTRACTION ———
Parameter			Data		EXTRACTION ———
Release Source:			All releases we China's HBCD		leled from previous risk assessments, reports, and
Release or Emissi	ion Factor:		1.0E-6 to 9.0E-		Ty Cava

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:	Study Citation: Takigami, H., Watanabe, M., Kajiwara, N 2014. Destruction behavior of hexabromocyclododecanes during incineration of solid waste containing expanded and extruded polystyrene insulation foams. Chemosphere.						
Data Type Hero ID					Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Japan		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2014		
	Metric 5:	Sample Size	Acceptable	3	Study contains all sampling data results, from which statistics can be surmised		
Domain 3: Acces	ssibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	well characterized		
Overall Quality I	Determinatio	»	High	1.1			
Extracted			Yes				
			- EXTRACT	TION -			
Parameter			Data				
Release Source:			EPS and XPS materials were respectively blended with refuse derived fuel (RDF) as input wastes for incineration. Concentrations of HBCDs contained in the EPS- and XPS-added RDFs, were 140 and 1100 mg kg 1, respectively.				
Disposal /Treatment Method: Waste Treatment Method:			Incineration destruction experiment  During the incineration experiments with EPS and XPS, primary and secondary combustion zones were maintained at temperatures of 840 C and 900 C. The residence times of waste in the primary combustion zone and flue gas in the secondary combustion zone was 30 min and three seconds, respectively.  Continued on next page				

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Study Citation:	Takigami, H., Watanabe, M., Kajiwa solid waste containing expanded and	· ·		f hexabromocyclododecanes during incine s. Chemosphere.	ration of
Data Type Hero ID	9 1			on Other than Exposure or Release Data;	I
Domain	Metric	Rating	Score	Comments	
P2 Control & pe	rcent Efficiency:	the two ex spectively. and fly ash HBCDs we	periments with EP HBCDs were also a samples. From the re sufficiently destro	tal HBCDs in the bag filter exit gas for S and XPS were 0.7 and 0.6 ng/m3, renot detected (<0.2 ng/g) in the bottom e obtained results, it was calculated that yed in the whole incineration process with e than 99.9999 for both of EPS and XPS	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:		W. A.,Kajiwara, N.,Takigami, Chemosphere.	H.,Harrad, S 2	016. Lea	aching behaviour of hexabromocyclododecane from treated		
Data Type Hero ID			ata or Informatic	n Other	than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Japan		
	Metric 3:	Applicability	Unacceptable	4	Out of scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2016		
	Metric 5:	Sample Size	Acceptable	3	Study contains all sampling data results, from which statistics can be surmised $$		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	well characterized		
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0			
Extracted			Yes				
-			EXTRACTION ——				
Parameter		Data					
Release Source:			HBCD into leachate				
Disposal /Treatment Method:			landfill				
Release Estimation	on Method:		Concentration of HBCD in leachate in which textiles were submerged				
			was measured	over tim	ne		
Annual Release Quantity (kg/yr):			310,000  tonnes	of texti	iles are disposed of by householders annually		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:					09. Transfer of hexabromocyclododecane from industrial	
Data Type Hero ID		o sediments and biota: Case stud rocessing; EPS resin mfg; Enviro	·	( 1 )	, Journal of Hydrology.	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	does not cover all release sources at the site	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Spain	
	Metric 3:	Applicability	Unacceptable	4	This use is out of scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2009	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Unacceptable	4	includes release media but no other metadata	
Domain 4: Varial	bility and U:	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n*	Unacceptable	4.0		
Extracted	Extracted					
			- EXTRACTION	ON —		
Parameter	Parameter		Data			
Environmental Media: Release or Emission Factor: Release Estimation Method:			surface water $2~{ m ug}~{ m HBCD/L}$ wastewater effluent sampled in WW effluent			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	7. SIDS initial assessment profill; All; Reports for Data or Info			,		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	The assessment or report uses high quality data and/or techniques that are not from trusted sources; however, Associated information does not indicate flaws or quality issues.		
Domain 2: Repre	sentative						
_	Metric 2:	Geographic Scope	Acceptable	3	EU		
	Metric 3:	Applicability	Acceptable	3	Information is not from a particular scenario, but can be applied to in-scope uses		
	Metric 4:	Temporal Representativeness	Acceptable	3	2007		
	Metric 5:	Sample Size	N/A	N/A	This metric is not applicable to this data type. This figure was obtained from a model		
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varial	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	n <sup>*</sup>	Medium	2.2			
Extracted			Yes				
Parameter		EXTRACTION ————————————————————————————————————					
Release Estimation Method: Waste Treatment Method: P2 Control & percent Efficiency:			EUSES model wastewater treatment overall HBCD removal at WWTP of 80 percent; The major part is expected to be adsorbed to the sludge				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Low=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	υ,	B.,et al.,. 2000. Kirk-Othmer H ll; Styrene Plastics; Reports for	<i>u</i> 1		l TechnologyStyrene plastics. her than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Unacceptable	4	Toxicity information is relevant to the Risk Assessment, but is not utilized by the engineering assessors	
	Metric 4:	Temporal Representativeness	Unacceptable	4	No Date (earliest sources from 1996)	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n *	Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Release Source:			Does not mention HBCD but describes the chemical and physical properties of styrene plastics in detail.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	Echa, 200 to its use.	9. Data on manufacture, import	, export, uses ε	and relea	ses of HBCDD as well as information on potential alternatives	
Data Type Hero ID	Release; A 3809166	ll; All; Reports for Data or Info	rmation Other	than E	xposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Multiple European countries	
	Metric 3:	Applicability	Acceptable	3	Provides infomration on both in-scope and out of scope uses.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2009	
	Metric 5:	Sample Size	Acceptable	3	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	fully transparent.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	discussion of variability or uncertainty	
Overall Quality Determination*		High	1.4			
Extracted			Yes			
Parameter		– EXTRACTION ———— Data				
Release Source:			Summarizes releases that are presented in the EURAR (HERO ID 3970747)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation:	Thomsen, C., Molander, P., Daae, H. L., Janák, K., Froshaug, M., Liane, V. H., Thorud, S., Becher, G., Dybing, E. 2007. Occupational exposure to hexabromocyclododecane at an industrial plant. Environmental Science and Technology.							
Data Type Hero ID		Processing; EPS Resin producti			nt. Environmental science and recimology.			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility Metric 1:	Methodology	Acceptable	3	A certified occupationallygienist from the company's Occupational Health Service executed the practical air sampling according to a detailed protocol.			
Domain 2: Repre	sentative Metric 2:	Geographic Scope	Acceptable	3	A Scandanavian Industrial Plant . Since all scandanavian			
					countries (Sweden, Denmark, Finland, Norway, Iceland) are in OECD this score is a 2			
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	The report was published in 2007 ( $> 10$ years ago)			
	Metric 5:	Sample Size	Unacceptable	4	Statistics of the sampling is not discussed.			
Domain 3: Access	eibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	All pertinent monitoring data is provided.			
Domain 4: Varial	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n*	Medium	2.0				
Extracted			Yes					
			- EXTRACTI	ON —				
Parameter			Data					
Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:			Dust Inhalation 0.24 ug/m3 - 150 ug/m3 (mean - 12.2 ug/m3; median - 2.1 ug/m3) 30 1 8-hr TWA 24 samples were taken for reactor working procedures and 6 were taken from mixer working procedures.					
			Continued on nex	t page				

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Study Citation:	Thomsen, C., Molander, P., Daae, H. pational exposure to hexabromocycle			Thorud, S.,Becher, G.,Dybing, E 2007. Occu- onmental Science and Technology.			
Data Type Hero ID	Exposure; Processing; EPS Resin pr 787728	oduction; Monitoring	g Data;				
Domain	Metric	Rating	Score	Comments			
Number of Work	xers:	10					
Type of Samplin	ıg:	Personal brea	Personal breathing zone				
Sampling Locati	on:	Reactor (24)	Reactor (24 samples) or Mixer (6 samples)				
Exposure Durati	ion:	8-hr	8-hr				
Exposure Freque	ency:	14 days at a	14 days at a time (7 day periods of no HBCD used in products)				
Bulk and Dust F	Particle Size Distribution:	20 nm to 2 n	20 nm to 2 mm HBCD particles				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:					decanes and tetrabromobisphenol-A in indoor air and dust			
Data Type Hero ID	_	gham, U.K: implications for hum Consumer Use; Insulation produced	-		3.			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relia	bility							
	Metric 1:	Methodology	Acceptable	3	Describes how the data was modeled from the HBCD dust concentrations $$			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	UK			
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (settled dust in homes). No associated worker activites.			
	Metric 4:	Temporal Representativeness	Acceptable	3	Published in 2008 ( 10 years ago)			
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.			
Domain 3: Acces	ecibility/Clar	citx						
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Specific details of studied samples, sampling and analytical-protocols, as well as statistical summaries of concentrations of individual HBCD in each sample are available online as well			
T)	1 '1'4 . 1 TT							
Domain 4: Varia	Metric 7:	ncertainty Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality	Determinatio	n*	Unacceptable	4.0				
Extracted			Yes					
			- EXTRACTION	ON —				
Parameter			Data					
Physical Form:			settled dust					
Route of Exposure:		Inhalation						
Exposure Concentration (Unit):		67 - 1,300 pg/m3 (mean - 250 pg/m3)						
Number of Sites:			33					
Type of Measurement or Method:			TWA					
Worker Activity:	:		Modeled data based on HBCD concentration in dust. No associated worker activity.					
		(	Continued on nex	t page				

	— <u>C</u> (	minueu irom p	page			
Study Citation:	Abdallah, M. A., Harrad, S., Covaci, A 2008. Hexabromocyclododecanes and tetrabromobisphenol-A in indoor air and dust in Birmingham, U.K: implications for human exposure. Environmental Science and Technology.					
Data Type	Exposure; Consumer Use; Insulation products in Homes; Monitoring Data;					
Hero ID	1079114	,				
Domain	Metric	Rating	Score	Comments		
Sampling Location	on:	Homes				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:	,	M. A., Harrad, S., Covaci, A. 20 cham, U.K: implications for hum			decanes and tetrabromobisphenol-A in indoor air and dust
Data Type Hero ID	_	Commerical Use; Insulation pro	-		30
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Describes how the data was modeled from the HBCD dust concentrations $$
Domain 2: Repre	esentative				
*	Metric 2:	Geographic Scope	Acceptable	3	UK
	Metric 3:	Applicability	Unacceptable	4	Occupational scenario (use of insulation in offices). No associated worker activities.
	Metric 4:	Temporal Representativeness	Acceptable	3	Published in 2008 ( 10 years ago)
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.
Domain 3: Acces			A		
	Metric 6:	Metadata Completeness	Acceptable	3	Specific details of studied samples, sampling and analytical- protocols, as well as statistical summaries of concentrations of individual HBCD in each sample are available online as well
Domain 4: Varial		•			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0	
Extracted			Yes		
			- EXTRACTION	ON —	
Parameter			Data		
Physical Form:			settled dust		
Route of Exposur	re:		Inhalation		
Exposure Concer	tration (Un	it):	70 - 460 pg/m	3 (mean	- 180 pg/m3)
Number of Sites:			25		
Type of Measure	ment or Met	shod:	TWA		
Worker Activity:			Modeled data worker activity		on HBCD concentration in dust. No associated
		С	Continued on nex	t page	

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Study Citation:	Abdallah, M. A., Harrad, S., Covaci, A 2008. Hexabromocyclododecanes and tetrabromobisphenol-A in indoor air and dust in Birmingham, U.K: implications for human exposure. Environmental Science and Technology.								
Data Type	Exposure: Commercial Use: Insulation	Exposure; Commercial Use; Insulation products in Offices; Monitoring Data;							
Hero ID	1079114	1	,	,					
Domain	Metric	Rating	Score	Comments					
Sampling Location	on:	Offices							

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Data Type   Exposure   Consumer Use; Insulation products in indoor public microenvironments; Monitoring Data;   Hero ID   Domain   1: Reliability   Metric 1:   Methodology   Acceptable   3   Describes how the data was modeled from the HBCD dust concentrations   Metric 2:   Geographic Scope   Acceptable   3   NUK   NURS   Metric 3:   Applicability   Unacceptable   4   Nun-constant of content of the cardion	Study Citation:		M. A., Harrad, S., Covaci, A. 20 gham, U.K: implications for hum			decanes and tetrabromobisphenol-A in indoor air and dust
Domain 1: Reliability Metric 1: Methodology  Acceptable  Metric 2: Geographic Scope Metric 3: Applicability Unacceptable Metric 5: Sample Size  Acceptable  Metric 5: Sample Size  Acceptable  Metric 6: Metadata Completeness Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Domain 4: Variability Determination  Metric 7: Metadata Completeness  Metric 8: Acceptable  Metric 9: Metadata Completeness  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness  Domain 4: Variability of uncertainty Metric 6: Metadata Completeness  Domain 5: Acceptable  Metric 6: Metadata Completeness  Domain 6: Metadata Completeness  Domain 6: Metadata Completeness  Domain 7: Metadata Completeness  Domain 8: Acceptable  Metric 8: Metadata Completeness  Domain 9: Acceptable  Metric 9: Metadata Completeness  Domain 10: Metadata Completeness  Domain 11: Reliability And Uncertainty Metric 12: Metadata Completeness  Metric 13: Metadata Completeness  Metric 14: Metadata Completeness  Metric 15: Metadata Completeness  Unacceptable  Metric 16: Metadata Completeness  Metric 17: Metadata Completeness  Metric 18: Metadata Completeness  Metric 19: Metadata Completeness  Metric 20: Metadata Metric Metric Metadata Complet	Data Type Hero ID	Exposure;				
Metric 1: Methodology	Domain		Metric	Rating	Score	Comments
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Unacceptable 3 UK  Metric 4: Temporal Representativeness Acceptable 3 Published in 2008 (10 years ago)  Metric 5: Sample Size Acceptable 3 Published in 2008 (10 years ago)  Metric 5: Sample Size Acceptable 3 Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size of the sample size of the sample size of the sample size.  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Acceptable 3 Specific details of studied samples, sampling and analytical protocols, as well as statistical summaries of concentrations of individual HBCD in eachsample are available online as well  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4.0 No discussion of variability or uncertainty  Overall Quality Determination    Extracted Yes    EXTRACTION    Data    Parameter    Parameter    Parameter    Parameter    Parameter    Settled dust Inhalation    Route of Exposure    Inhalation    Settled dust Inhalation    Settled dust Inhalation    Settled data based on HBCD concentration in dust. No associated worker activity.	Domain 1: Relia	bility				
Metric 2: Geographic Scope Metric 3: Applicability Unacceptable 3 UK Non-occupational scenario (settled dust in gen pop areas). No associated worker activities.  Metric 4: Temporal Representativeness Metric 5: Sample Size Acceptable 3: Published in 2008 (10 years ago) Metric 5: Sample Size Acceptable 3: Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Metric 7: Metadata Completeness Unacceptable 4: No discussion of variability or uncertainty Metric 7: Metadata Completeness Unacceptable 4: No discussion of variability or uncertainty  Overall Quality Determination*  Extracted Yes  EXTRACTION  Data  EXTRACTION  Data  EXTRACTION  Data  EXTRACTION  Data  EXTRACTION  Settled dust Inhalation  Exposure Concentration (Unit):  820-960 pg/m3 (mean - 900 pg/m3)  Number of Sites:  4  Type of Measurement or Method:  Modeled data based on HBCD concentration in dust. No associated worker activity.		Metric 1:	Methodology	Acceptable	3	
Metric 3: Applicability Unacceptable 4 Non-occupational scenario (settled dust in gen pop areas). No associated worker activities.  Metric 4: Temporal Representativeness Acceptable 3 Published in 2008 (10 years ago)  Metric 5: Sample Size Acceptable 3 Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample sate each location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate ach location. However, provides several statistics of the sample sate number of several statistics of the sample sate number of location. However, provides several statistics of the sample sate number of location. However, provides several statistics of the sample sate number of location. However, provides several statistics of the sample sate number of location. However, provides several statistics of the samples ach several statistics of the	Domain 2: Repre	esentative				
Metric 4: Temporal Representativeness Metric 5: Sample Size  Acceptable 3 Published in 2008 (10 years ago)  Acceptable 3 Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Acceptable 3 Specific details of studied samples, sampling and analytical-protocols, as well as statistical summaries of concentrations of individual HBCD in eachsample are available online as well  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination*  Extracted Yes  EXTRACTION  Data  EXTRACTION  Physical Form: Route of Exposure: Inhalation Route of Exposure: Inhalation Secusion of variability or uncertainty  Mumber of Sites: 4  Type of Measurement or Method: TWA Modeled data based on HBCD concentration in dust. No associated worker activity.	•		Geographic Scope	Acceptable	3	UK
Metric 5: Sample Size  Acceptable  Accepta		Metric 3:	Applicability	Unacceptable	4	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Acceptable 3 Specific details of studied samples, sampling and analytical-protocols, as well as statistical summaries of concentrations of individual HBCD in each sample are available online as well  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination*  Unacceptable 4.0  Extracted Yes  EXTRACTION  Parameter  Data  EXTRACTION  Data  Physical Form: Route of Exposure: Inhalation Exposure Concentration (Unit): Secue 960 pg/m3 (mean - 900 pg/m3)  Number of Sites: 4 TWA  Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.		Metric 4:	Temporal Representativeness	Acceptable	3	Published in 2008 ( 10 years ago)
Metric 6: Metadata Completeness Acceptable 3 Specific details of studied samples, sampling and analytical protocols, as well as statistical summaries of concentrations of individual HBCD in each sample are available online as well  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination*  Ves  EXTRACTION —  Data  EXTRACTION —  Data  Physical Form: Route of Exposure: Exposure Concentration (Unit): S20-960 pg/m3 (mean - 900 pg/m3)  Number of Sites: 4  Type of Measurement or Method: TWA  Modeled data based on HBCD concentration in dust. No associated worker activity.		Metric 5:	Sample Size	Acceptable	3	samples at each location. However, provides several statistics
Metric 6: Metadata Completeness Acceptable 3 Specific details of studied samples, sampling and analytical protocols, as well as statistical summaries of concentrations of individual HBCD in each sample are available online as well  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination*  Ves  EXTRACTION —  Data  EXTRACTION —  Data  Physical Form: Route of Exposure: Exposure Concentration (Unit): S20-960 pg/m3 (mean - 900 pg/m3)  Number of Sites: 4  Type of Measurement or Method: TWA  Modeled data based on HBCD concentration in dust. No associated worker activity.	Domain 3: Acces	ssibility/Clar	city			
Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination*  Unacceptable 4.0  Extracted Yes  EXTRACTION —  Data  Parameter  Data  Settled dust Inhalation Exposure: Inhalation Exposure Concentration (Unit): 820-960 pg/m3 (mean - 900 pg/m3) Number of Sites: 4  Type of Measurement or Method: TWA Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Domain 6. Neces			Acceptable	3	protocols, as well as statistical summaries of concentrationsof
Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination*  Unacceptable 4.0  Extracted Yes  EXTRACTION —  Data  Parameter  Data  Settled dust Inhalation Exposure: Inhalation Exposure Concentration (Unit): 820-960 pg/m3 (mean - 900 pg/m3) Number of Sites: 4  Type of Measurement or Method: TWA Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Domain 4: Varia	hility and H	noortointy			
Extracted  Parameter  Data  EXTRACTION  Data  Physical Form: Route of Exposure: Inhalation Exposure Concentration (Unit): Seposure Concentration (Unit): Seposure of Sites: Type of Measurement or Method: TWA Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Domain 4. varia	·	v	Unacceptable	4	No discussion of variability or uncertainty
Parameter  Data  Physical Form: Route of Exposure: Inhalation Exposure Concentration (Unit): 820-960 pg/m3 (mean - 900 pg/m3) Number of Sites: 4 Type of Measurement or Method: TWA  Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Overall Quality I	Determinatio	n*	Unacceptable	4.0	
Parameter Data  Physical Form: settled dust Route of Exposure: Inhalation Exposure Concentration (Unit): 820- 960 pg/m3 (mean - 900 pg/m3) Number of Sites: 4 Type of Measurement or Method: TWA Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Extracted			Yes		
Physical Form:  Route of Exposure:  Inhalation  Exposure Concentration (Unit):  Number of Sites:  4  Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.					NC	
Route of Exposure:  Exposure Concentration (Unit):  Number of Sites:  Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.	Parameter					
Exposure Concentration (Unit):  820- 960 pg/m3 (mean - 900 pg/m3)  Number of Sites:  4  Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.	Physical Form:			settled dust		
Number of Sites: 4 Type of Measurement or Method: Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.						
Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.	=	•	it):	201	3 (mean	1 - 900  pg/m3)
Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.						
	* *		- 11			
Continued on part page				worker activity		
Continued on next page			C	Continued on nex	t page	

	– <b>c</b> c	ontinued from p	revious page	
Study Citation:	Abdallah, M. A., Harrad, S., Covaci, A., in Birmingham, U.K: implications for h		·	nd tetrabromobisphenol-A in indoor air and dust nce and Technology.
Data Type Hero ID	Exposure; Consumer Use; Insulation pr 1079114	roducts in indoor p	public microenviror	nments; Monitoring Data;
Domain	Metric	Rating	Score	Comments
Sampling Location	on:	Public Micro	environments	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:	,	M. A., Harrad, S., Covaci, A. 20 cham, U.K: implications for hum			lecanes and tetrabromobisphenol-A in indoor air and dust
Data Type Hero ID	-	Consumer Use; Outdoor Air; M	-	WHOIIIR	Shear Science and Teenhology.
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Describes how the data was modeled from the HBCD dust concentrations $$
Domain 2: Repre	esentative				
-	Metric 2:	Geographic Scope	Acceptable	3	UK
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (outdoor air dust in gen pop areas). No associated worker activites.
	Metric 4:	Temporal Representativeness	Acceptable	3	Published in 2008 ( 10 years ago)
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.
Domain 3: Acces				_	
	Metric 6:	Metadata Completeness	Acceptable	3	Specific details of studied samples, sampling and analytical- protocols, as well as statistical summaries of concentrations of individual HBCD in each sample are available online as well
Domain 4: Varial					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0	
Extracted			Yes		
			- EXTRACTION	ON —	
Parameter			Data		
Physical Form:			Dust		
Route of Exposur	re:		Inhalation		
Exposure Concen	tration (Un	it):	34 - 40 pg/m3	(mean -	37  pg/m3
Number of Sites:			5		
Type of Measure	ment or Met	shod:	TWA		
Worker Activity:			Modeled data worker activity		on HBCD concentration in dust. No associated
		(	Continued on nex	t page	

	— C(		evious page	
Study Citation:	Abdallah, M. A., Harrad, S., Covaci, A., in Birmingham, U.K: implications for h		v	and tetrabromobisphenol-A in indoor air and dust ience and Technology.
Data Type	Exposure; Consumer Use; Outdoor Air	; Monitoring Data;		
Hero ID	1079114	,		
Domain	Metric	Rating	Score	Comments
Sampling Location	on:	Outdoor Air		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:	,	M. A., Harrad, S., Covaci, A 20 cham, U.K: implications for hum			lecanes and tetrabromobisphenol-A in indoor air and dust	
Data Type Hero ID	_	Consumer Use; Indoor Air; Mor	-	WHOIIII	ental Science and Technology.	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Describes how the data was modeled from the HBCD dust concentrations $$	
Domain 2: Repre	esentative					
*	Metric 2:	Geographic Scope	Acceptable	3	UK	
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (outdoor air dust in gen pop areas). No associated worker activites.	
	Metric 4:	Temporal Representativeness	Acceptable	3	Published in 2008 ( 10 years ago)	
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.	
D	-:1-:1:4/(-1	:				
Domain 3: Acces	Metric 6:	Metadata Completeness	Unacceptable	4	Only includes amount in dust (essentially an HBCD concentration)	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0		
Extracted			Yes			
Parameter			– EXTRACTION – Data	ON —		
Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Sites:		Dust Inhalation				
		90 ng/g - 140,0 97	000 ng/g	g  (mean - 8,300 ng/g)		
Type of Measurement or Method: Worker Activity:			Concentration in dust HBCDs found from several products used in indoor environments. No associated worker activity.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		nzardous Substances Data, Bank Import; Import; Reports for Da			oromocyclododecane. ner than Exposure or Release Data;	
Domain	***************************************	Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Acceptable	3	Importation is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	Acceptable	3	Information is from 3 CDR reporting sites, which represents only the sites exceeding the reporting threshold, so maybe not every possible site	
Domain 3: Access	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited	
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	Report addresses CBI claims, but not much else	
Overall Quality I	Determinatio	»	High	1.2		
Extracted			Yes			
Parameter			- EXTRACI Data	rion –		
Worker Activity: Number of Workers:			Workers at importation and manufacturing sites per 2012 CDR $<$ 10 to 25-49 workers per site			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	į S	v		ocyclododecane (HBCD)- PEC34. eted Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Information collected from journal studies		
Domain 2: Repr	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	UK, Belgium		
	Metric 3:	Applicability	Unacceptable	4	Occupational scenario (use of insulation in offices). No associated worker activities. $$		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008-2010		
	Metric 5:	Sample Size	Acceptable	3	Mean and median provided, no other statistics. 16 samples, unknown $\#$ of sites		
Domain 3: Acce	ssibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	ability and H	ncortainty					
Domain 4. varie	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability		
Overall Quality	Determination	n*	Unacceptable	4.0			
Extracted			Yes				
			- EXTRACTI	ON			
Parameter			Data				
Physical Form:			settled dust				
Route of Exposu		- )	Inhalation				
Exposure Concentration (Unit):		Mean = 1400 ug/kg dust, Median = 650 ug/kg dust (UK); Mean = 592 ug/kg dust, Median = 367 ug/kg dust (Belgium)					
Number of Samples:		16		50. 45/115 4450 (DOLGIAIII)			
Number of Sites:			Unknown (>10	0)			
Type of Measure	ement or Met	thod:	HBCD concentration in dust was measured and exposure was calculated				
			with assumptions. See assumptions on page 59. Office workers. No associated worker activity.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a Import; Import; Completed Exp		-	mocyclododecane (HBCD)- PEC34. nents;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Based on accepted model from Europe	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Australia	
	Metric 3:	Applicability	Acceptable	3	Use in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	Acceptable	3	Model - uncertainty provided, distribution of results provided	
Domain 3: Acces	sibility/Clar	itx				
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited	
Domain 4: Varia	bility and H	naartainty				
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided	
Overall Quality I	Determinatio	on*	High	1.1		
Extracted			Yes			
			- EXTRACT	CIONI		
Parameter		Data	TON -			
Physical Form:			Dust			
Route of Exposure:			Inhalation			
Exposure Concer			$0.20.5~\mathrm{mg/m}$	3 (typic	eal); 0.55 mg/m3 (worst case)	
Type of Measure		hod:	Modelled (se		,	
Worker Activity:			repackaging into smaller pack sizes or in the event of an accident or spill			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	012. Priority existing chemical a Import; Import; Completed Exp			mocyclododecane (HBCD)- PEC34. nents;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Based on accepted model from Europe	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Australia	
	Metric 3:	Applicability	Acceptable	3	Use in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	Acceptable	3	${\it Model - uncertainty \ provided}, \ distribution \ of \ results \ provided$	
Domain 3: Acces	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited	
Domain 4: Varia	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided	
Overall Quality I	Determinatio	n*	High	1.1		
Extracted			Yes			
Parameter		EXTRACT	CION -			
Physical Form:			Dust			
Route of Exposure:		Dermal				
Exposure Concer			57570  ?g/kg	bw/d (	powder); 29290 ?g/kg bw/d (granules)	
Type of Measure		hod:	Modelled (se			
Worker Activity:			repackaging into smaller pack sizes or in the event of an accident or spill			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS compounding;			ocyclododecane (HBCD)- PEC34. Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information collected from surevey respondents	
Domain 2: Repre	esentative					
_	Metric 2:	Geographic Scope	Acceptable	3	Australia	
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	Acceptable	3	Results from 1 respndent	
Domain 3: Acces	sibility/Cla	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited	
Domain 4: Varia	hility and II	n containte				
Domain 4. varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion	
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.7		
Extracted			Yes			
		-	- EXTRACTI	on —		
Parameter			Data			
Physical Form:			Dust			
Type of Measure	ment or Met	thod:	respondents fr	om surve	ey	
Worker Activity:			Adding HBCD	to the	mixture	
Number of Work	ers:		1			
Exposure Duration:		$10  \min/\mathrm{day}$				
Exposure Freque	•		$180  \mathrm{days/yr}$			
Bulk and Dust P			2 mm granules	or 50-6	0 um powder	
	trol & perce	nt Exposure Reduction:	LEV			
PPE:			Overalls, safety glasses, leather or chemical resistant gloves, dust masks and respirators			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS compounding;		-	mocyclododecane (HBCD)- PEC34. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Results extracted from a study in Scotland		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Scotland		
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope or may be used as surrogate data		
	Metric 4:	Temporal Representativeness	Acceptable	3	2005		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient $$		
Domain 3: Acces	acibility /Clay	·••					
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
D . 4 W .	1 '1'' 1 TT						
Domain 4: Varia	Metric 7:	ncertainty Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided		
Overall Quality	Determinatio	»	High	1.6			
Extracted			Yes				
			- EXTRACT	TION -			
Parameter			Data				
Physical Form:			Dust				
Route of Exposu		- >	Inhalation	, -			
Exposure Concentration (Unit):		2.89-21.5  mg/m3					
Number of Samples:			12				
Number of Sites: Type of Measurement or Method:			2				
		tnod:	Short-term Adding HBCD powder to the mixture				
Worker Activity: Type of Samplin			personal	שס powe	der to the mixture		
Exposure Durati			personai 13-56 mins				
Exposure Duran			19-90 IIIIIS				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS compounding;		-	mocyclododecane (HBCD)- PEC34. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	bility						
	Metric 1:	Methodology	Acceptable	3	Results extracted from a study in Scotland		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Scotland		
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope or may be used as surrogate data		
	Metric 4:	Temporal Representativeness	Acceptable	3	2005		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient $$		
Damain 2. Acces	aibilites/Class	.:					
Domain 3: Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
D	1						
Domain 4: Varial	Metric 7:	ncertainty Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided		
Overall Quality I	Determinatio	»	High	1.6			
Extracted			Yes				
			- EXTRACI	ΓΙΟΝ -			
Parameter			Data				
Physical Form:			Dust				
Route of Exposur			Inhalation				
Exposure Concentration (Unit):			0.12-3.36 mg/m3				
Number of Samples:			12				
Number of Sites: Type of Measure		had:	2 8 hr TWA				
Worker Activity:		mod:	8 hr TWA Adding HBCD powder to the mixture				
Type of Sampling			personal	D POW	ter to the myrane		
Type of Sampling: Exposure Duration:			personal 480 mins				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS compounding;		-	mocyclododecane (HBCD)- PEC34. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Results extracted from a study in Scotland		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Scotland		
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope or may be used as surrogate data		
	Metric 4:	Temporal Representativeness	Acceptable	3	2005		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient		
Domain 3: Acces	esibility/Clas	nity.					
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	bility and H	neertainty					
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided		
Overall Quality	Determinatio	n*	High	1.6			
Extracted			Yes				
			- EXTRACT	TION -			
Parameter			Data				
Physical Form:			Dust				
Route of Exposu		- >	Inhalation	, -			
Exposure Concentration (Unit):		0.07-14.7 mg	g/m3				
Number of Samples:			18				
Number of Sites:			3				
Type of Measure		thod:	full-shift Adding HBCD powder to the mixture				
Worker Activity:				വ pow	ier to the mixture		
Type of Samplin Exposure Durati			personal 275-504 min	a			
Pyhosare Darati	011.		210-004 IIIII	<u>.</u>			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS compounding;		-	mocyclododecane (HBCD)- PEC34. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Results extracted from a study in Scotland		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Scotland		
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope or may be used as surrogate data		
	Metric 4:	Temporal Representativeness	Acceptable	3	2005		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient		
Domain 2, Acces	oibility/Clar	.;;+					
Domain 3: Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
T	1						
Domain 4: Varia	Metric 7:	ncertainty Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided		
Overall Quality I	Determinatio	* on	High	1.6			
Extracted			Yes				
Extracted							
Parameter			- EXTRACT Data	rion –			
			Dust				
Physical Form: Route of Exposu	ro.		Dust Inhalation				
		it):	4.35-12.1 mg	r/m3			
Exposure Concentration (Unit): Number of Samples:			4.50-12.1 mg/m5 4				
Number of Samples: Number of Sites:			$\frac{4}{2}$				
Type of Measurement or Method:			full-shift				
Worker Activity:			Weighing HBCD powder before addition				
Type of Sampling			personal	PO			
			124-350 mins				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; XPS production; Co			mocyclododecane (HBCD)- PEC34. Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Results extracted from journal article		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2001		
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient		
Domain 3: Acces	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	bility and III	naortaintr					
Domaii 4. variai	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty		
Overall Quality I	Determinatio	*	High	1.4			
Overall Spaniely 1	Je ce i i i i i i i i i i i i i i i i i i	74	111811	1x			
Extracted			Yes				
			- EXTRACT	TION -			
Parameter			Data				
Physical Form:			Dust				
Route of Exposur	re:		Inhalation				
Exposure Concen		it):	$2-880 \text{ ug/m}^3$	3			
Number of Samp	les:		17				
Number of Sites:		6					
Type of Measurement or Method:			full-shift				
Worker Activity:			area samplin	ig at fee	d deck		
Type of Sampling			area				
Sampling Location			feed deck				
Exposure Duration	on:		4.4-23.9 hou	rs			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; XPS production; Co			mocyclododecane (HBCD)- PEC34. Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliabi	ility				
	Metric 1:	Methodology	Acceptable	3	Results extracted from journal article
Domain 2: Repres	entative				
-	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient
Domain 3: Access	ibility/Clar	itv			
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited
Domain 4: Variab	ility and III	naortainty			
	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty
Overall Quality D	eterminatic	n **	High	1.4	
Extracted			Yes		
			- EXTRACT	ION -	
Parameter			Data		
Physical Form:			Dust		-
Route of Exposure			Inhalation		
Exposure Concent		(t):	$3\text{-}15~\mathrm{ug/m}3$		
Number of Sample	es:		9		
Number of Sites:			6		
Type of Measurem	ient or Met	hod:	Short-term		
Worker Activity:			routine work		
Type of Sampling:			personal		
Exposure Duration	n:		3-7.3  hrs		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; XPS production; Co		-	mocyclododecane (HBCD)- PEC34. Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Results extracted from journal article
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient
Domain 3: Acces	esibility/Clar	oitx.			
Domain 6. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited
Demois 4: Vania	hilitar and III				
Domain 4: Varia	Metric 7:	ncertainty Metadata Completeness	Acceptable	3	Limited discussion on uncertainty
			<u>r</u>		
Overall Quality I	Determinatio	* on	High	1.4	
T					
Extracted			Yes		
			- EXTRACT	rion -	<u> </u>
Parameter			Data		
Physical Form:			Dust		
Route of Exposu			Inhalation		
Exposure Concer		it):	$40~\mathrm{ug/m3}$		
Number of Samp			6		
Number of Sites:			6		
Type of Measure		thod:	Short-term		
Worker Activity:			cleaning feed	d deck	
Type of Samplin			personal		
Exposure Durati	on:		$1   \mathrm{hr}$		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS converting; Co			mocyclododecane (HBCD)- PEC34. Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Results extracted from journal article
Domain 2: Repre	esentative				
•	Metric 2:	Geographic Scope	Acceptable	3	Norway
	Metric 3:	Applicability	Acceptable	3	Use in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2007
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited
Domain 4: Varia	bility and H	ncortainty			
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided
Overall Quality I	Determinatio	» Dn	High	1.3	
Extracted			Yes		
			- EXTRACT	rion -	
Parameter			Data		
Physical Form:			Dust		
Route of Exposu	re:		Inhalation		
Exposure Concer	ntration (Un	it):	Mean = 0.5	ug/m3	
Number of Samp	les:		6	•	
Number of Sites:			1		
Type of Measure		thod:	full-shift		
Number of Work			$3/\mathrm{shift}$		
Type of Sampling			area		
Sampling Location			mixer room		
Exposure Duration	on:		8  hr		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; EPS converting; Co			mocyclododecane (HBCD)- PEC34. Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Results extracted from journal article
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Norway
	Metric 3:	Applicability	Acceptable	3	Use in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2007
	Metric 5:	Sample Size	Acceptable	3	Statistical distribution provided; Sample size provided and seems sufficient
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited
Domain 4: Varia	hility and II	naoytainty			
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided
Overall Quality I	Determinatio	»	High	1.3	
Extracted			Yes		
			- EXTRACT	rion -	
Parameter			Data		
Physical Form:			Dust		
Route of Exposu	re:		Inhalation		
Exposure Concer	ntration (Un	it):	Mean = 15.3	l ug/m3	
Number of Samp		•	24	- 1	
Number of Sites:			1		
Type of Measure	ment or Met	thod:	full-shift		
Number of Work	ers:		$3/\mathrm{shift}$		
Type of Sampling			area		
Sampling Location	on:		reactor roon	1	
Exposure Duration	on:		8  hr		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; XPS compounding;		-	mocyclododecane (HBCD)- PEC34. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Based on accepted model from Europe		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Australia		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Acceptable	3	Model - uncertainty provided, distribution of results provided		
Domain 3: Acces	cibility/Clar	str					
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	hility and H	naoutainty					
Domain 4: varia	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided		
	1/100110 1.	Medada Completeness	Песериале		Oncertainty and variability discussion provided		
Overall Quality I	Determinatio	n*	High	1.1			
Extracted			Yes				
			- EXTRACT	TON			
Parameter		Data	TON -				
Physical Form:			Dust				
Route of Exposure:			$\operatorname{dermal}$				
Exposure Concer	tration (Un	it):	$0.11 \text{ mg/cm}^2$				
Type of Measure	ment or Met	hod:	Modelled (se	ection $6$ .	5)		
Worker Activity:			direct handling and intermittent, non-dispersive use				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a Processing; XPS compounding;		-	mocyclododecane (HBCD)- PEC34. or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relia	bility							
	Metric 1:	Methodology	Acceptable	3	Based on accepted model from Europe			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	Australia			
	Metric 3:	Applicability	Acceptable	3	Use in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2012			
	Metric 5:	Sample Size	Acceptable	3	${\it Model - uncertainty provided, distribution of results provided}$			
Domain 3: Acces	ssibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided			
Overall Quality l	Determinatio	n*	High	1.1				
Extracted			Yes					
Parameter		EXTRACI Data	TION -					
Physical Form:			Dust					
Route of Exposure:			Inhalation					
Exposure Concer		it):	see table 10.	3				
Type of Measure			Modelled (se	ection 6.	5)			
Worker Activity:				addition and weighing				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a All; HBCD in dust; Completed	assessments: Hyexabromocyclododecane (HBCD)- PEC34. Exposure or Risk Assessments;					
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Based on accepted model from Europe			
Domain 2: Repre	esentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Australia			
	Metric 3:	Applicability	Unacceptable	4	Non-occupational exposure that can be applied to occupational			
	Metric 4:	Temporal Representativeness	Acceptable	3	2003			
	Metric 5:	Sample Size	Acceptable	3	Model - uncertainty provided, distribution of results provided			
Domain 3: Acces	sibility/Clar	ity						
Domain o. Treco.	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited			
Domain 4: Varia	bility and U	ncertainty						
Domesti I. Varia	Metric 7:	Metadata Completeness	Acceptable	3	Uncertainty and variability discussion provided			
Overall Quality I	Determinatio	n*	Medium	1.8				
Extracted			Yes					
Parameter			— EXTRACTION ————————————————————————————————————					
Physical Form:			Dust					
Route of Exposure:			Oral to dust					
Exposure Concer	ntration (Un	it):	1.9 (typical) to	12 (wo	rst case) ng/kg-day			
Type of Measure		hod:	Modelled (pg 2					
Worker Activity:			Exposure to HBCD in indoor soil and dust					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		2017. Haz-Map: Agent name: All; Reports for Data or Inform				
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Unacceptable	4	Unknown	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Acceptable	3	Captures all possible stages, some of which are not in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2016	
	Metric 5:	Sample Size	Unacceptable	4	Unknown	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Unacceptable	4	Unknown	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion	
Overall Quality I	Determinatio	$\mathbf{n}^*$	Unacceptable	4.0		
Extracted			Yes			
Parameter			EXTRACTION Data	ON		
Worker Activity: Number of Workers:			worker esitmate across entire lifecycle 100 to 999			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromo Manufacture; Manufacture; Cor		e or Ris	k Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	Distribution of samples is characterized by no statistics.
Domain 3: Acces	seibility/Clay	rity			
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality l	Determinatio	» n	High	1.6	
Extracted			Yes		
Parameter			– EXTRACTI Data	on —	
Physical Form:			dust		
Route of Exposu		•. \	Inhalation		
Exposure Concentration (Unit):		0.0094  mg/m3			
Number of Sites: Type of Measurement or Method:			short-term, 88	mine	
Worker Activity:		mou.	filling of 25 kg		n hags
Type of Samplin			area	57 1 001	1 2000
Exposure Durati			88 mins		
Bulk and Dust P		Distribution:	20-150 ?m		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromoe Manufacture; Manufacture; Cor	·		Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	characterized by a range uncertain statistics	
Domain 3: Access	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, as-	
	Metric o.	Metadata Completeness	Acceptable	3	sessment of report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	n*	High	1.4		
Extracted			Yes			
Parameter	Parameter		- EXTRACT Data	TION -		
	Physical Form: Route of Exposure:		dust Dermal	_ , _		
Exposure Concen			1 to 5 mg/cr			
Type of Measurer Worker Activity:	ment or Met	hod:	Modelled by filling of 25 l		ton bags	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoo Processing; XPS masterbatch; (	-		or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
Domain 2. Repre	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2005
	Metric 5:	Sample Size	Acceptable	3	Fully characterized
Domain 3: Acces		=			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the
					results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n*	High	1.3	
Extracted			Yes		
			- EXTRAC	ΓΙΟΝ -	
Parameter			Data		
Physical Form:			granule		
Route of Exposu	re:		Inhalation		
Exposure Concentration (Unit): Number of Samples:			$0.88 \; (\mathrm{mean})$	, 1.36 (9	0th) mg/m $3$
			10	·	
Type of Measure		hod:	8-hr TWA		
Worker Activity:			mixing and	weighing	5
Type of Sampling	g:		personal		
Exposure Duration	on:		$19-295 \min$		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromod Processing; XPS masterbatch; C	·		or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
1	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2005
	Metric 5:	Sample Size	Acceptable	3	unknown if TWA, only know 90th percentile
Domain 3: Acces	sibility/Clar	itv			
Domain o. Treess	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and H	ncortainty			
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	* n	High	1.4	
Extracted			Yes		
Parameter			- EXTRACT Data	rion –	
Physical Form:			granule		
Route of Exposur	re:		Inhalation		
Exposure Concentration (Unit):		0.16 mg/m3	(90th)		
Number of Samples:		4	, ,		
Type of Measure		hod:	unknown		
Worker Activity:			extruder ope	erator	
Type of Sampling	g:		personal		
Exposure Duration	_		5 hours		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromo Processing; XPS masterbatch; (	·		or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
1	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	Acceptable	3	unknown if TWA, unknown worker activities
Domain 3: Acces	sibility/Clar	ritv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the
					results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on*	High	1.4	
Extracted			Yes		
Parameter			- EXTRACT Data	ΓΙΟΝ –	
Physical Form:			powder		
Route of Exposu	re:		Inhalation		
Exposure Concer	tration (Un	it):	ND to 1.6 m	$_{ m ig/m3}$	
Number of Samp	les:		16		
Number of Sites:			2		
Type of Measure	ment or Met	shod:	unknown		
Worker Activity:			unknown		
Type of Sampling	_		area		
Exposure Duration	on:		40-480 min		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromoe Processing; XPS masterbatch; (	U		or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
•	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	Acceptable	3	unknown if TWA, unknown worker activities
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the
					results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on*	High	1.4	
Extracted			Yes		
Parameter			EXTRACI	ΓΙΟΝ –	
Physical Form:			granule		
Route of Exposu	re:		Inhalation		
Exposure Concer		it):	ND to 0.88 1	mg/m3	
Number of Samp	,		32	•	
Number of Sites:			6		
Type of Measure		thod:	unknown		
Worker Activity:			unknown		
Type of Sampling	_		area and per		
Exposure Duration	on:		40-1435  min		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoo Processing; cutting of XPS boar			sure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
1	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2005
	Metric 5:	Sample Size	Acceptable	3	unknown if TWA, unknown worker activities
Domain 3: Acces	sibility/Clar	itv			
Domain o. Meecs	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	hility and II	n aont ainte			
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n	High	1.4	
Extracted			Yes		
			- EXTRACT	ΓΙΟΝ –	
Parameter			Data		
Physical Form:			solid		
Route of Exposu	re:		Inhalation		
Exposure Concer	ntration (Un	it):	$0.22~\mathrm{mg/m3}$	(90th)	
Number of Samp	oles:		42		
Number of Sites:			3		
Type of Measure	ment or Met	hod:	unknown		
Worker Activity:			unknown		
Type of Sampling	g:		area?		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromoo Processing; XPS masterbatch; C	·		or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Norway		
	Metric 3:	Applicability	Acceptable	3	In scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2007		
	Metric 5:	Sample Size	Acceptable	3	unknown if TWA, unknown worker activities		
Domain 3: Acces	sibility/Clar	itv					
Domain o. Neces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	* n	High	1.4			
Extracted			Yes				
Parameter			- EXTRACT	ΓΙΟΝ –			
Physical Form:			powder				
Route of Exposure:		Inhalation	/2009	odion 0.5.2 m/m2)			
Exposure Concentration (Unit):			/ mə, me	edian 0.5 ?g/m3)			
Number of Samples: Type of Measurement or Method:			30 unknown				
Worker Activity:		mou.	mixer opera	tor			
Type of Sampling			personal	UOI			
Exposure Duration	_		8-hr				
Exposure Duran			<u> </u>				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromod Processing; XPS masterbatch; C	U		r Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Norway
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2007
	Metric 5:	Sample Size	Acceptable	3	unknown if TWA, unknown worker activities
Domain 3: Acces	sibility/Clar	itv			
Domain 9. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and III	naortainty			
Domain 4. Varia		Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n*	High	1.4	
Extracted			Yes		
			- EXTRACT	rion -	
Parameter			Data		
Physical Form:			powder		
Route of Exposur			Inhalation		
Exposure Concen		it):		m3, me	dian 2.7 ?g/m3
Number of Samples:		30			
Type of Measure	ment or Met	hod:	unknown		
Worker Activity:			reactor oper	ator	
Type of Sampling			personal		
Exposure Duration	on:		8-hr		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoe Processing; EPS Resin producti			ure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2005
	Metric 5:	Sample Size	Acceptable	3	Fully characterized
Domain 3: Acces	ssibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality l	Determinatio	on*	High	1.6	
Extracted			Yes		
Parameter			- EXTRACT Data	TION -	
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Type of Sampling: PPE:		powder Inhalation Mean: 1.290 percent -ile: 1.1 mg/m3 8-hr TWA adding to vessel personal Most workers were reported to use gloves, overall, eye protection, and			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		8. Risk assessment: hexabromoo Processing; EPS Resin producti			ure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2005	
	Metric 5:	Sample Size	Acceptable	3	Fully characterized	
Domain 3: Acces  Domain 4: Varial	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	,*	High	1.6		
Extracted			Yes			
Parameter			EXTRACTION ————————————————————————————————————			
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Type of Sampling: PPE:			powder Inhalation Mean: 7.290 percent -ile: 10.6 mg/m3 8-hr TWA Weighing HBCD powder before addition personal Most workers were reported to use gloves, overall, eye protection, and disposable respirator.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1\ \text{to} < 1.7;\ \text{Medium} =\geq 1.7\ \text{to} < 2.4;\ \text{Low} =\geq 2.4\ \text{to} < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromoe Processing; XPS compounding;	·		or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
•	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	In scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range uncertain statistics
Domain 3: Acces	sibility/Clar	itv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n"	High	1.2	
Extracted			Yes		
			- EXTRACI	TION -	
Parameter			Data		
Physical Form:			powder		
Route of Exposu	re:		Dermal		
Exposure Concer		it):	0-0.1  mg/cm	ı2/day	
Type of Measure			Modelled by		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P.		emical problem	formul	ation and initial assessment. Cyclic aliphatic bromide cluster
Data Type Hero ID		All; Reports for Data or Inform	ation Other th	nan Exp	osure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable	3	Captures releases from all possible stages, some of which are not in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	sibility/Cla	$\operatorname{ritv}$			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.3	
Extracted			Yes		
Parameter			- EXTRACT Data	TION -	
Number of Work	ers:		<2100		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P. flame reta		emical problem for	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster		
Data Type Hero ID		Manufacture or Processing; Ma	nufacture, Proce	ssing EI	PS or XPS; Monitoring Data;		
Domain	3609211	Metric	Rating	Score	Comments		
Domain		Wethe	rtanng	bare	Comments		
Domain 1: Reliab	bility						
	Metric 1:	Methodology	Unacceptable	4	Sampling or analytical methodology is not specified.		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	EPS compounding and MFG not in scope, but other scenarios are		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics		
D ' 9 A	7.70 /61	•.					
Domain 3: Acces	sibility/Clai Metric 6:	nty Metadata Completeness	Acceptable	3			
	Metric o:	Metadata Completeness	Acceptable		Monitoring data include most critical metadata, such as sample type and exposure type, but lacks additional metadata, such as sample durations, exposure durations, exposure frequency		
Domain 4: Varial	bility and H	ncortainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determination	* Dn	Medium	1.8			
Extracted			Yes				
			- EXTRACTION	ON			
Parameter			Data				
Physical Form:			dust				
Route of Exposure:			Inhalation				
Exposure Concer	,		0.1 to $2.5$ mg/s				
Type of Measure		thod:			ssessment (HERO 3970747)		
Worker Activity:			handling stand processing	ard grad	de HBCD powder at sites for the manufacture or		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation:	U.S, E. P. flame reta		emical problem fo	ormulati	on and initial assessment. Cyclic aliphatic bromide cluste
Data Type Hero ID		Manufacture or Processing; Ma	nufacture, Proce	ssing EI	PS or XPS; Monitoring Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	bility				
	Metric 1:	Methodology	Unacceptable	4	Sampling or analytical methodology is not specified.
Domain 2: Repre	esentative				
1	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	EPS compounding and MFG not in scope, but other scenarios are
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	sibility/Clai Metric 6:	rity Metadata Completeness	Acceptable	3	Monitoring data include most critical metadata, such as sample type and exposure type, but lacks additional metadata, such as sample durations, exposure durations, exposure frequency
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determination	on*	Medium	1.8	
Extracted			Yes		
			- EXTRACTION	ON	
Parameter			Data		
Physical Form:			solid		
Route of Exposu			Dermal		
Exposure Concer	,	,	84 to 840 mg/e		
Type of Measure		thod:			ssessment (HERO 3970747)
Worker Activity:			handling stand processing	ard grad	de HBCD powder at sites for the manufacture or

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		mmary risk assessment report: I Manufacture; Manufacture; Cor	-				
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	ability						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repr	resentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics		
Domain 3: Acce	essibility/Clar	ity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	ability and U:	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality	Determination	»	High	1.6			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Physical Form:			Fine powder	(via mi	cronisation)		
Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:		Inhalation	1.0	/ 9 / . 1			
		Worst case = 10 mg/m3; typical = 5 mg/m3 from monitoring data or modelled					
Worker Activity		snod;					
Bulk and Dust l		Distribution:	Filling of bags at the production of HBCDD micronised typically 3 to 4?m, powder typically 50 to 250?m; granulates typically > 500?m				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: Manufacture; Cor			
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	ability				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repr	resentative				
z omani zv respr	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acce	essibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia		· ·	411	9	
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality	Determination	* n	High	1.6	
Extracted			Yes		
Parameter			– EXTRACT Data	TION -	
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Bulk and Dust Particle Size Distribution:		Fine powder (via micronisation)  Dermal  4200 mg/day  from monitoring data or modelled  Filling of bags at the production of HBCDD  micronised typically 3 to 4 ?m, powder typically 50 to 250 ?m; granulates typically > 500 ?m			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: Manufacture; Cor			
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repr	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	ssibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	ability and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion
			11000001010		mmed discussion
Overall Quality	Determinatio	n*	High	1.6	
Extracted			Yes		
Parameter			– EXTRACT Data	TION -	
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Bulk and Dust Particle Size Distribution:			from monito Filling of ba	ring dat gs at th ypically	g/m3; typical = $0.95 \text{ mg/m3}$ sa or modelled e production of HBCDD 3 to 4?m, powder typically 50 to 250?m; granulates

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: l Manufacture; Manufacture; Cor			
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repr	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	ssibility/Clar Metric 6:	ity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	ability and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion
		The state of the s	<u>F</u>		
Overall Quality	Determination	n*	High	1.6	
Extracted			Yes		
Parameter			- EXTRACT Data	TION -	
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Bulk and Dust Particle Size Distribution:			from monito Filling of ba	ring dat gs at the ypically	m ng/m3; typical = 0.1 mg/m3 as or modelled production of HBCDD 3 to 4?m, powder typically 50 to 250?m; granulates

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: l Manufacture; Manufacture; Cor			
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
Bollium 2. Ropic	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	sibility/Clar	itv			
<b>5.</b> 11000.	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality l	Determination	n*	High	1.6	
Extracted			Yes		
Parameter			- EXTRACT Data	TION -	
Physical Form:			powder		
Route of Exposure:			Dermal		
Exposure Concer			840 mg/day		1-11-1
Type of Measure		inod:			a or modelled
Worker Activity: Bulk and Dust Particle Size Distribution:		Filling of bags at the production of HBCDD micronised typically 3 to 4?m, powder typically 50 to 250?m; granulates typically > 500?m			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: I Manufacture; Manufacture; Cor			
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
Domain 20 respire	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	sibility/Clar	itv			
Domain o. Meees	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	n*	High	1.6	
Extracted			Yes		
Parameter			– EXTRACI Data	TION -	
Physical Form:			granule		
Route of Exposu			Dermal		
Exposure Concer			84 mg/day		1.11. 1
Type of Measure		shod:			a or modelled
Worker Activity: Bulk and Dust Particle Size Distribution:		Filling of bags at the production of HBCDD micronised typically 3 to 4 ?m, powder typically 50 to 250 ?m; granulates typically > 500 ?m			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: Processing; Formulation of XPS				
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	In scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty		Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality I	Determinatio	n*	High	1.3		
Extracted			Yes			
Parameter			EXTRACTION ————————————————————————————————————			
Physical Form:			Fine powder	(via mi	cronisation)	
Route of Exposu		:+\.	Inhalation Warst sass	91	r/m2: tunical — 1 55 mg/m2	
Exposure Concentration (Unit): Type of Measurement or Method:			= $3.1 \text{ mg/m3}$ ; typical = $1.55 \text{ mg/m3}$ ring data or modelled			
Type of Measure Worker Activity:		ilou.				
Worker Activity: Bulk and Dust Particle Size Distribution:		Adding HBCD to process micronised typically 3 to 4 ?m, powder typically 50 to 250 ?m; granulates typically > 500 ?m				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: l Processing; Formulation of XPS				
Domain		Metric	Rating	Score	Comments	
Domain 1: Relia	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
z omani z ropr	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	In scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics	
Domain 3: Accessibility/Clarity  Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty		Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality	Determinatio	* H	High	1.3		
Extracted			Yes			
Parameter			- EXTRACT Data	rion -		
	Route of Exposure:		Fine powder Dermal	(via mi	cronisation)	
Exposure Concer Type of Measure			120 mg/day	nina dat	a ay madallad	
		snod:			a or modelled	
Worker Activity: Bulk and Dust Particle Size Distribution:		Adding HBCD to process micronised typically 3 to 4 ?m, powder typically 50 to 250 ?m; granulates typically > 500 ?m				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	mmary risk assessment report: l Processing; Formulation of XPS	Hexabromocyclododecane. 5; Completed Exposure or Risk Assessments;				
Domain		Metric	Rating	Score	Comments	
Domain 1: Relia	ability					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repr	resentative					
Bomain 20 respi	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	In scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty			Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality	Determination	n*	High	1.3		
Extracted			Yes			
Parameter			– EXTRACT Data	TION -		
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Bulk and Dust Particle Size Distribution:			powder Inhalation Worst case = 2.5 mg/m3; typical = 1.25 mg/m3 from monitoring data or modelled Adding HBCD to process micronised typically 3 to 4?m, powder typically 50 to 250?m; granulates typically > 500 ?m			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	mmary risk assessment report: l Processing; Formulation of XPS	Hexabromocyclododecane. ; Completed Exposure or Risk Assessments;				
Domain		Metric	Rating	Score	Comments	
Domain 1: Relia	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
Domain 2. reopi	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	In scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics	
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Domain 4: Variability and Uncertainty			Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality	Determination	* H	High	1.3		
Extracted			Yes			
Parameter			- EXTRACT Data	rion -		
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity: Bulk and Dust Particle Size Distribution:			granule Inhalation Worst case = 0.22 mg/m3; typical = 0.11 mg/m3 from monitoring data or modelled Adding HBCD to process micronised typically 3 to 4?m, powder typically 50 to 250?m; granulates typically > 500?m			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	mmary risk assessment report: l Processing; Formulation of XPS	Hexabromocyclododecane. S; Completed Exposure or Risk Assessments;					
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
Domain 2. Teepr	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	In scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics		
Domain 4: Varia	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality	Determinatio	n*	High	1.3			
Extracted			Yes				
Parameter			- EXTRACT Data	TION -			
Physical Form:			powder				
Route of Exposure:			Dermal				
Exposure Concentration (Unit):		84  mg/day					
Type of Measurement or Method:		from monito	ring dat	a or modelled			
Worker Activity:		Adding HBC	CD to pi	rocess			
Bulk and Dust Particle Size Distribution:			micronised typically 3 to 4 ?m, powder typically 50 to 250 ?m; granulates typically > 500 ?m				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	<ul> <li>ion: . 2008. Summary risk assessment report: Hexabromocyclododecane.</li> <li>Exposure; Processing; Formulation of XPS; Completed Exposure or Risk Assessments;</li> <li>3970756</li> </ul>						
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	In scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics		
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia		· ·					
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	n*	High	1.3			
Extracted			Yes				
Parameter		- EXTRACT Data	TION -				
Physical Form:			granule				
Route of Exposure:		Dermal					
Exposure Concentration (Unit):		8.4  mg/day					
Type of Measurement or Method:				a or modelled			
Worker Activity:		Adding HBC	-				
Bulk and Dust Particle Size Distribution:			micronised typically $> 5$		3 to 4?m, powder typically 50 to 250?m; granulates		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Type Exposure; Manufacture; Monitoring Data;						
Domain	***************************************	Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Unacceptable	4	Sampling or analytical methodology is not specified.		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Monitoring data do not include any needed metadata to understand what the data represent and are not usable in the risk evaluation		
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determination	n*	Unacceptable	4.0			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Physical Form: Route of Exposure: Exposure Concentration (Unit):  Type of Measurement or Method:			powder Inhalation 0.18 mg/m3 of HBCD in dust (respirable); 1.23 mg/m3 HBCD in dust (total) measured				
Worker Activity:			Packaging of powders				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		9. Prioritisation and Annex XIV Manufacture; Manufacture; Mon	V background information: hexbromocyclododecane. nitoring Data;				
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial							
	Metric 1:	Methodology	Acceptable	3	approved modelling approach		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics		
Domain 3: Acces	sibility/Clay	oitx.					
Domain 5. Acces	Metric 6:	Metadata Completeness	Unacceptable	4	Enough metadata to be used		
Domain 4: Varial	bility and H	ncortainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	n*	Medium	1.8			
Extracted			Yes				
Parameter			- EXTRACTI Data	on —			
Physical Form:			powder				
Route of Exposure:			Dermal				
Exposure Concentration (Unit):			170  mg/day				
Type of Measurement or Method:			modelled with EASE				
Worker Activity:			Packaging of p	owders			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Data Type		9. Prioritisation and Annex XIV Manufacture; Manufacture; Mon	_	ormatio	n: hexbromocyclododecane.
Domain		Metric	Rating	Score	Comments
Domain 1: Reliabi	lity				
	Metric 1:	Methodology	Acceptable	3	approved modelling approach
Domain 2: Represe	entative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but filling of bags can be applied to Import
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Accessi	bility/Clar	itv			
	Metric 6:	Metadata Completeness	Unacceptable	4	Enough metadata to be used
Domain 4: Variabi	lity and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality De	eterminatio	*	Medium	1.8	
Extracted			Yes		
Parameter			- EXTRACTION - Data	ON	
Physical Form:			granule		
Route of Exposure:			Dermal		
Exposure Concentration (Unit):			17  mg/day		
Type of Measurement or Method:			modelled with		
Worker Activity:			Packaging of p	owders	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Data Type	en: Echa, 2009. Prioritisation and Annex XIV background information: hexbromocyclododecane. Exposure; Processing; XPS formulation; Monitoring Data; 3970759								
Domain		Metric	Rating	Score	Comments				
Domain 1: Reliabi	lity								
	Metric 1:	Methodology	${\bf Unacceptable}$	4	Sampling or analytical methodology is not specified.				
Domain 2: Represe	entative								
-	Metric 2:	Geographic Scope	Acceptable	3	Europe				
	Metric 3:	Applicability	Acceptable	3	In scope				
	Metric 4:	Temporal Representativeness	Acceptable	3	2008				
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics				
Domain 3: Accessi	ibility/Clar	rity							
	Metric 6:	Metadata Completeness	Unacceptable	4	Monitoring data do not include any needed metadata to un- derstand what the data represent and are not usable in the risk evaluation				
Domain 4: Variabi	ility and U	ncertainty							
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion				
Overall Quality De	eterminatio	»	Unacceptable	4.0					
Extracted			Yes						
			- EXTRACTION	ON —					
Parameter			Data						
Physical Form:			Dust						
· ·			Inhalation						
-			mean 0.01 mg/m3 (respirable), 0.03 mg/m3 (total)						
			measured						
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:			Inhalation mean 0.01 mg/	/m3 (res	pirable), 0.03 mg/m3 (to				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Echa, 2009. Prioritisation and Annex XIV background information: hexbromocyclododecane. Exposure; Processing; EPS, HIPS, production of textile coating; Monitoring Data; 3970759							
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	oility							
	Metric 1:	Methodology	Unacceptable	4	Sampling or analytical methodology is not specified.			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	These compounding processes are not in scope but may provide baseline for other scenarios			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics			
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness			Unacceptable	4	Monitoring data do not include any needed metadata to un- derstand what the data represent and are not usable in the risk evaluation			
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0				
Extracted			Yes					
Parameter	Parameter		- EXTRACTION Data	ON —				
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:			Dust Inhalation mean total dus measured	st 1.18 t	o 1.89 mg/m3			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	9. Prioritisation and Annex XIV Processing; HBCDD use for XP	_		· ·
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	approved modelling approach
Domain 2: Repre	esentative				
_	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	XPS in scope but others are not
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	sibility/Clar	itv			
	Metric 6:	Metadata Completeness	${\bf Unacceptable}$	4	Enough metadata to be used
Domain 4: Varia	bility and H	neortainty			
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	» n	Medium	1.8	
Extracted			Yes		
Parameter		EXTRACTI Data	ON		
Physical Form:			Solid		
Route of Exposure:			Dermal		
Exposure Concentration (Unit):			17  mg/day		
Type of Measurement or Method:			modelled		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Data Type of Exposure; Commercial Use; Insulation products in offices; Wontrollers;	Study Citation:			BPA in particul	late pha	se of indoor air in Shenzhen, China. Science of the Total			
Domain 1: Reliability Metric 1: Methodology  Acceptable  Metric 2: Geographic Scope Metric 2: Geographic Scope Metric 3: Applicability Metric 4: Temporal Representativeness Metric 5: Sample Size  Acceptable  Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable Acceptable A No discussion of variability or uncertainty Acceptable Acceptabl		Exposure;		ducts in offices;	Monitor	ing Data;			
Metric 1:   Methodology	Domain		Metric	Rating	Score	Comments			
Domain 2: Representative Metric 2: Geographic Scope Metric 3: Applicability Unacceptable Metric 3: Sample Size Unacceptable Metric 4: Temporal Representativeness Metric 5: Sample Size Acceptable Acceptable Metric 5: Sample Size Acceptable Acc	Domain 1: Relial	bility							
Metric 2: Geographic Scope   Unacceptable   4		Metric 1:	Methodology	Acceptable	3				
Metric 2: Geographic Scope   Unacceptable   4	Domain 2: Repre	esentative							
Metric 4: Temporal Representativeness Acceptable 3 2013  Metric 5: Sample Size Acceptable 3 1 Indicates number of locations and provides several statistics of the sample size.  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness Acceptable 3 Monitoring data include all associated metadata.  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty Metric 7: Medium 2.0  Extracted Yes  EXTRACTION  Data  Physical Form: Route of Exposure: Exposure Concentration (Unit): 27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3)  Number of Samples: 56 (1 per site) Number of Sites: 56  Type of Measurement or Method: T	•		Geographic Scope	Unacceptable	4	China (non-OECD country)			
Metric 5: Sample Size  Acceptable  Acceptable  Acceptable  Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness  Metric 7: Metadata Completeness  Unacceptable  Medium  2.0  Extracted  Yes  EXTRACTION  Parameter  Parameter  Physical Form: Route of Exposure: Route of Exposure: Route of Exposure: Route of Samples: Number of Metaure on Method: TWA  Modeled data based on HBCD concentration in dust. No associated worker activity.		Metric 3:	Applicability	Unacceptable	4	sure) that is similar to an occupational scenario (service life)			
Domain 3: Accessibility/Clarity Metric 6: Metadata Completeness		Metric 4:	Temporal Representativeness	Acceptable	3	2013			
Metric 6: Metadata Completeness Acceptable 3 Monitoring data include all associated metadata.  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination* Medium 2.0  Extracted Yes  EXTRACTION — Data  Parameter  Outst captured on indoor air filters  Route of Exposure: Inhalation Exposure Concentration (Unit): 27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3)  Number of Samples: 56 (1 per site)  Number of Sites: 56  Type of Measurement or Method: TWA  Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.		Metric 5:	Sample Size	Acceptable	3				
Metric 6: Metadata Completeness Acceptable 3 Monitoring data include all associated metadata.  Domain 4: Variability and Uncertainty Metric 7: Metadata Completeness Unacceptable 4 No discussion of variability or uncertainty  Overall Quality Determination* Medium 2.0  Extracted Yes  EXTRACTION — Data  Parameter  Outst captured on indoor air filters  Route of Exposure: Inhalation Exposure Concentration (Unit): 27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3)  Number of Samples: 56 (1 per site)  Number of Sites: 56  Type of Measurement or Method: TWA  Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Domain 3: Acces	sibility/Clar	itv						
Medium 2.0  Extracted Yes  EXTRACTION  Parameter Data  Ous captured on indoor air filters  Route of Exposure:  Route of Exposure:  Route of Samples:  Number of Samples:  Number of Sites:  Type of Measurement or Method:  TWA  Worker Activity:  Medium 2.0  EXTRACTION  EXTRACTION  Data  Ous captured on indoor air filters  Inhalation  27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3)  TWA  Modeled data based on HBCD concentration in dust. No associated worker activity.			=	Acceptable	3	Monitoring data include all associated metadata.			
Medium 2.0  Extracted Yes  EXTRACTION  Parameter Data  Consider the suppose of th	Domain 4: Varial	bility and U	ncertainty						
Extracted  Parameter  Data  Concentration (Unit):  Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:  Extraction  Yes  EXTRACTION  Lexaction  Aust captured on indoor air filters Inhalation  27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3)  56 (1 per site)  TWA  Modeled data based on HBCD concentration in dust. No associated worker activity.				Unacceptable	4	No discussion of variability or uncertainty			
Parameter Data  Physical Form: dust captured on indoor air filters Route of Exposure: Inhalation Exposure Concentration (Unit): 27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3) Number of Samples: 56 (1 per site) Number of Sites: 56 Type of Measurement or Method: TWA Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Overall Quality I	Determinatio	n*	Medium	2.0				
Physical Form: Route of Exposure: Inhalation Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:  Data  dust captured on indoor air filters Inhalation 27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3) 56 (1 per site) 756 17WA  Modeled data based on HBCD concentration in dust. No associated worker activity.	Extracted			Yes					
Physical Form: Route of Exposure: Inhalation Exposure Concentration (Unit): Number of Samples: Number of Sites: Type of Measurement or Method: Worker Activity:  Data  dust captured on indoor air filters Inhalation 27.3 - 2,274 pg/m3 (mean - 1,001 pg/m3) 56 (1 per site) 756 17WA  Modeled data based on HBCD concentration in dust. No associated worker activity.				- EXTRACTION	ON				
Route of Exposure:  Exposure Concentration (Unit):  Number of Samples:  Number of Sites:  Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.	Parameter								
Route of Exposure:  Exposure Concentration (Unit):  Number of Samples:  Number of Sites:  Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.	Physical Form:			dust captured	on indo	or air filters			
Number of Samples: 56 (1 per site)  Number of Sites: 56  Type of Measurement or Method: TWA  Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Route of Exposu	· ·							
Number of Sites: 56 Type of Measurement or Method: TWA Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.	Exposure Concentration (Unit):			27.3 - 2,274  pg/m3 (mean - 1,001 pg/m3)					
Type of Measurement or Method:  Worker Activity:  Modeled data based on HBCD concentration in dust. No associated worker activity.	1			( 1 /					
Worker Activity: Modeled data based on HBCD concentration in dust. No associated worker activity.									
worker activity.									
Continued on next page	worker Activity:								
			C	Continued on nex	t page				

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Study Citation: Ni, H. G.,Zeng, H 2013. HBCD and TBBPA in particulate phase of indoor air in Shenzhen, China. Science of the To Environment.  Data Type Exposure; Commerical Use; Insulation products in offices; Monitoring Data; Hero ID 1927552  Domain Metric Rating Score Comments  Type of Sampling: Cenral air conditioner filter dusts were collected as particulate phase of indoor air (PPIA)  Sampling Location: Offices Bulk and Dust Particle Size Distribution: PM2.5 (Paricle Size 0.4 - 2.2 um)	- continued from previous page									
Data Type Exposure; Commerical Use; Insulation products in offices; Monitoring Data; Hero ID 1927552  Domain Metric Rating Score Comments  Type of Sampling: Central air conditioner filter dusts were collected as particulate phase of indoor air (PPIA)  Sampling Location: Offices	Study Citation:	, , , ,								
Type of Sampling:  Cenral air conditioner filter dusts were collected as particulate phase of indoor air (PPIA)  Sampling Location:  Offices	v 1	Exposure; Commerical Use; Insulation products in offices; Monitoring Data;								
indoor air (PPIA) Sampling Location: Offices	Domain	main Metric Rating Score Comments								
	Type of Samplin	g:			ets were collected as particulate phase of					
Bulk and Dust Particle Size Distribution: PM2.5 (Paricle Size 0.4 - 2.2 um)	Sampling Location	on:	Offices	Offices						
	Bulk and Dust F	Particle Size Distribution:	PM2.5 (Pari	PM2.5 (Paricle Size 0.4 - 2.2 um)						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:	Ni, H. G.,	Zeng, H 2013. HBCD and TE	BPA in particul	late pha	se of indoor air in Shenzhen, China. Science of the Total		
D / T	Environme			<b>.</b>			
Data Type Hero ID	Exposure; 1927552	Commercial Use; Insulation pro	ducts in offices;	Monitor	ing Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Describes how the data was modeled from the HBCD dust concentrations $$		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	${\bf Unacceptable}$	4	China (non-OECD country)		
	Metric 3:	Applicability	Unacceptable	4	The data are for a non-occupational scenario (consumer exposure) that is similar to an occupational scenario (service life) within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Acceptable	3	2013		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations and provides several statistics of the sample size. $ \\$		
Domain 3: Access	sibility/Cla	$\operatorname{ritv}$					
	Metric 6:	Metadata Completeness	Acceptable	3	Monitoring data include all associated metadata.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	2.0			
Extracted			Yes				
Parameter			– EXTRACTI Data	ON —			
Physical Form:			dust captured	on indo	or air filters		
Route of Exposure: Exposure Concentration (Unit): Number of Samples: Number of Sites:		Inhalation					
		13.5 - 1,099 pg/m3 (mean - 235 pg/m3)					
		56 (1 per site) 56					
Type of Measurement or Method:			TWA				
Worker Activity:			Modeled data based on HBCD concentration in dust				
			Continued on nex	t page			

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, H. G., Zeng, H 2013. HBCD at	1 CDDDA '						
nvironment.	nd IBBPA in partic	ulate phase of inde	oor air in Shenzhen, China. Science of the Total				
Exposure; Commerical Use; Insulation products in offices; Monitoring Data; 1927552							
Metric	Rating	Score	Comments				
		Cenral air conditioner filter dusts were collected as particulate phase of indoor air (PPIA)					
	Offices						
cle Size Distribution:	PM10 (Paric	PM10 (Paricle Size 2.5 - 8.9 um)					
	xposure; Commerical Use; Insulation 27552	xposure; Commerical Use; Insulation products in offices 27552  Metric Rating  Cenral air co indoor air (P Offices	Metric Rating Score  Cenral air conditioner filter dus indoor air (PPIA) Offices				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			BBPA in particul	late pha	se of indoor air in Shenzhen, China. Science of the Total		
Data Type Hero ID	Environme Exposure; 1927552		ucts in indoor pu	ıblic mic	croenvironments; Monitoring Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Unacceptable	4	Does not specify releases since mostly measure dust concentration for exposure modeling		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	UK		
	Metric 3:	Applicability	Unacceptable	4	The data are for a non-occupational scenario (consumer exposure) that is similar to an occupational scenario (service life) within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Acceptable	3	Published in 2008 ( 10 years ago)		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations but does not specify number of samples at each location. However, provides several statistics of the sample size.		
Domain 3: Acces	sibility/Clar	ritx7					
	Metric 6:	Metadata Completeness	Unacceptable	4	Release data include release media but no other metadata.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determination	n*	Low	2.4			
Extracted			Yes				
Parameter			– EXTRACTI Data	ON —			
Exposure Concer Number of Sites: Type of Measure	Route of Exposure: Exposure Concentration (Unit):		settled dust Inhalation 90 ng/g - 140,000 ng/g (mean - 8,300 ng/g) 97 Concentration in dust				
Worker Activity:			HBCDs found from several products used in indoor environments. No associated worker activity.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:					M. D., Harrad, S. J., Rauert, C. B., Spengler, J. D 2013. nvironmental Health: A Global Access Science Source.	
Data Type Hero ID	-	Commerical Use; Insulation pro	_			
Domain		Metric	Rating	Score	Comments	
Domain 1: Relia	bility					
	Metric 1:	Methodology	Unacceptable	4	Does not specify releases, only dust concentrations	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Unacceptable	4	The data are for a non-occupational scenario (consumer exposure) that is similar to an occupational scenario (service life) within the scope of the risk evaluation	
	Metric 4:	Temporal Representativeness	Acceptable	3	Samples were collected in 2010	
	Metric 5:	Sample Size	Acceptable	3	Provides number of samples but little statistical bases	
Domain 3: Acces	raibility/Clay	it.				
Domain 5. Acces	Metric 6:	Metadata Completeness	Unacceptable	4	Only includes amount in dust (essentially an HBCD concentration)	
Domain 4: Varia	bility and H	ncortainty				
Domain 4. varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality l	Determination	n*	Medium	2.2		
Extracted			Yes			
Parameter			– EXTRACTI Data	ON		
Physical Form: Route of Exposure: Exposure Concentration (Unit): Number of Sites: Type of Measurement or Method: Worker Activity:			settled dust Inhalation 180 - 1,100,000 ng/g HBCD in dust 40 Concentration in dust HBCD in dust collected on airplanes on floor and in vents. No associated worker activity.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1\ \text{to} < 1.7;\ \text{Medium} =\geq 1.7\ \text{to} < 2.4;\ \text{Low} =\geq 2.4\ \text{to} < 3.$ 

Study Citation:		· · ·			M. D., Harrad, S. J., Rauert, C. B., Spengler, J. D 2013 Invironmental Health: A Global Access Science Source.		
Data Type Hero ID	-	Consumer Use; Insulation produ	-				
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Unacceptable	4	Does not specify releases, only dust concentrations		
Domain 2: Repre	esentative						
-	Metric 2:	Geographic Scope	Acceptable	3	US		
	Metric 3:	Applicability	Unacceptable	4	The data are for a non-occupational scenario (consumer exposure) that is similar to an occupational scenario (service life) within the scope of the risk evaluation		
	Metric 4:	Temporal Representativeness	Acceptable	3	Samples were collected in 2010		
	Metric 5:	Sample Size	Acceptable	3	Provides number of samples but little statistical bases		
D	3 33 /69	•					
Domain 3: Acces	Metric 6:	Metadata Completeness	Unacceptable	4	Only includes amount in dust (essentially an HBCD concentration)		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	2.2			
Extracted			Yes				
Parameter			- EXTRACTION - Data	ON —			
Physical Form:			settled dust		-		
Route of Exposure: Exposure Concentration (Unit): Number of Sites:		Inhalation					
		2 - 2,800  ng/g	HBCD :	in dust			
		13					
Type of Measure	ment or Met	thod:	Concentration	in dust			
Worker Activity:			HBCD in dust collected from homes. No associated worker activity.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:	,	m United Kingdom cars, homes,		*	i, A 2008. Concentrations of brominated flame retardants iability and implications for human exposure. Environment	
Data Type Hero ID	Exposure; 1005148	Commerical Use; Insulation pro	educts in offices;	Monitor	ing Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Methodology is well described	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	UK	
	Metric 3:	Applicability	Unacceptable	4	The data are for a non-occupational scenario (consumer exposure) that is similar to an occupational scenario (service life) within the scope of the risk evaluation	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations and provides several statistics of the sample size. $ \\$	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Include necessary metadata	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.6		
Extracted			Yes			
			- EXTRACTION	ON		
Parameter			Data			
Exposure Concer	Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method:		settled dust Inhalation 31,000 ?PBDEs/g Concentration in dust Average concentrations of polybrominated diphenyl ethers (PBDEs) in dust in 18 offices. No associated worker activities.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,	· ·	`	,	rity existing chemical assessment report no. 20. PS; Reports for Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Australia
	Metric 3:	Applicability	Acceptable	3	In-scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	N/A	N/A	This metric is not applicable to this data type
Domain 3: Access	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U:	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on *	High	1.4	
Extracted			Yes		
			EXT	RACT	TION ———
Parameter			Data		
			Continu	ed on ne	ext page

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			I	LO -
Study Citation: Data Type Hero ID		, ,	-	ng chemical assessment report no. 20. rts for Data or Information Other than Exposure or Release Data;
Domain	Metric	Rating S	core	Comments
Worker Activity:		lation of flame they weigh, tra ing pure/concer formulated resi exposed to the resulting from on non-volatile, ex handling liquid dust generated of volatile, the	retarded resingly retarded PBFF retails and mixing the second of the sec	dustry, that is those involved in the formus, have the greatest risk of exposure since the solid powder or liquid resins contains. Downstream fabricators who handle the and/or polymers are also expected to be mal contact is the main route of exposure hese solutions. Given that the PBFRs are malation is expected to be minimal when ver, potential for exposure by inhalation of growder compounds is high. Some release tion products of some PBFRs may occur at processing temperatures.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:					M. D., Harrad, S. J., Rauert, C. B., Spengler, J. D. 2013.		
Data Type Hero ID	-	to flame retardant chemicals on Consumer Use; Insulation produ	-		nvironmental Health: A Global Access Science Source. ng Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Methodology is well described		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	US		
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (settled dust in homes). No associated worker activites.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2017		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of locations and provides several statistics		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and H	noortainty					
Domain 4. varia	v	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on*	Unacceptable	4.0			
Extracted			Yes				
Parameter			– EXTRACTI Data	ON —			
Physical Form: Route of Exposure: Exposure Concentration (Unit): Type of Measurement or Method: Worker Activity:			settled dust Inhalation 6 - 2000 ng HBCD/g dust Concentration in dust Average concentrations of HBCD in homes. No associated worker activity.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:	0,		٠,		ase of hexabromocyclododecane (HBCD) and Nano- and		
Data Type Hero ID	-	cles from thermal cutting of pol Processing; XPS Thermal Cutti			30		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
-	Metric 2:	Geographic Scope	Acceptable	3	Switzerland		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	itv					
Domain of Treese	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	bility and H	ncartainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	n N	High	1.6			
Extracted			Yes				
			– EXTRACTI	ON —			
Parameter			Data				
Physical Form:			Dust				
Route of Exposu	re:		Inhalation				
Exposure Concentration (Unit):		$89.0~\mathrm{ug/m3}$					
Worker Activity:	Worker Activity:		Modeled personal area breathing zone based on closed glovebox sampling				
			system				
Number of Work			1				
Type of Sampling	_		personal				
Sampling Location			Thermal cutting	ng opera	tion		
Exposure Duration	on:		1 hour				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:					ase of hexabromocyclododecane (HBCD) and Nano- and		
Data Type Hero ID	_	cles from thermal cutting of pol Processing; EPS Thermal Cutti					
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
_	Metric 2:	Geographic Scope	Acceptable	3	Switzerland		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.		
D	-:1-:1:4/C1	:					
Domain 3: Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	=	_		4			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	n*	High	1.6			
Extracted			Yes				
			- EXTRACTI	ON —			
Parameter			Data				
Physical Form:			Dust				
Route of Exposur	re:		Inhalation				
Exposure Concentration (Unit):		57.3  ug/m3					
Worker Activity:		Modeled personal area breathing zone based on closed glovebox sampling system					
Number of Worke	ers:		1				
Type of Sampling			personal				
Sampling Location			Thermal cutting	ng opera	tion		
Exposure Duration:		1 hour					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation:	Exposure t	o flame retardants in electronics	s recycling sites.	Annals	1 (3			
Data Type Hero ID	Exposure; 1927633	Disposal; Disposal of Waste of I	Electric and Elec	tronic E	equipment (WEEE); Monitoring Data;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	ility							
	Metric 1:	Methodology	Acceptable	3	Methodology is well described			
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	Finland			
	Metric 3:	Applicability	Unacceptable	4	Out of scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2009			
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics			
Domain 3: Access	sibility/Clar	ity						
Domain o. Necesi	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
D . '. 4 W '.	*1*4 . 1 TT.							
Domain 4: Variab	Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality D	eterminatio	n*	Unacceptable	4.0				
Extracted			Yes					
			- EXTRACTION	ON				
Parameter			Data					
Physical Form:			Dust					
Route of Exposur			Inhalation					
Exposure Concentration (Unit):			8-50  ng HBCD/m3					
Number of Samples:			45					
Number of Sites:			4					
Worker Activity:			The workers water trollers.	ere eithe	er sorters or dismantlers, or both, or process con-			
Number of Worke	rs:		34					
Type of Sampling:			personal					
Exposure Duration:			191 to 408 min.					
-								

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Study Citation:	Rosenberg, C., Hämeilä, M., Tornaeus, J., Säkkinen, K., Puttonen, K., Korpi, A., Kiilunen, M., Linnainmaa, M., Hesso, A. 2011. Exposure to flame retardants in electronics recycling sites. Annals of Occupational Hygiene.						
Data Type Hero ID	*	v	9		nent (WEEE); Monitoring Data;		
Domain	M	etric l	Rating	Score	Comments		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation: Data Type Hero ID		nuki, A.,Seto, H 2007. Indoor Consumer Use; Insulation produ			olybrominated flame retardants in Tokyo. Indoor Air. og Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Methodology is well described		
Domain 2: Repre	sentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Japan		
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (settled dust in homes). No associated worker activites.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2006		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics		
Domain 3: Access	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	oility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	on*	Unacceptable	4.0			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Physical Form:			settled dust				
Route of Exposure:			Inhalation				
Exposure Concen	tration (Un	it):	up to $24 \text{ ng/m}$	3			
Number of Sampl			18				
Type of Measurer Worker Activity:	ment or Met	thod:	Concentration in dust HBCD in dust collected from homes. No associated worker activity.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		nuki, A.,Seto, H 2007. Indoor Commerical Use; Insulation pro		-	lybrominated flame retardants in Tokyo. Indoor Air. ing Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Methodology is well described		
Domain 2: Repre	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Japan		
	Metric 3:	Applicability	Unacceptable	4	Occupational scenario (use of insulation in offices). No associated worker activities.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2006		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U: Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	n*	Unacceptable	4.0			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Physical Form:			settled dust				
Route of Exposure:			Inhalation				
Exposure Concentration (Unit):			up to $29.5 \text{ ng/m}3$				
Number of Samp			14				
Type of Measure	ment or Met	shod:	Concentration	in dust			
Worker Activity:			HBCD in dust	collecte	d from offices. No associated worker activities.		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:				lgren, H	.,Jakobsson, K.,Bergman, A 2014. Brominated flame retar-		
Data Type Hero ID	-	sure of aircraft personnel. Chem Commerical Use; Insulation pro	-	anes ; M	Ionitoring Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Methodology is well described		
Domain 2: Repre	esentative						
Domain 2. Repre	Metric 2:	Geographic Scope	Acceptable	3	Sweden		
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in aircraft). Will be assessed by Exposure Assessors (not Engineering Assessors)		
	Metric 4:	Temporal Representativeness	Acceptable	3	2014		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics		
D	-:'L:'l:'4 /@l	:					
Domain 3: Acces	Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4. Vania	hility and II	n containts					
Domain 4: Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality l	Determinatio	on <sup>*</sup>	High	1.1			
Extracted			Yes				
			- EXTRACT	rion -			
Parameter		Data					
Physical Form:			dust				
Route of Exposure:		Inhalation					
Exposure Concentration (Unit):		<LOD to 15	500  pmo	l/m3			
Number of Samples:			6				
Type of Measure		thod:	Concentration in dust				
Worker Activity:			-	ing mai	ntenancework		
Type of Samplin	g:		personal				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		Smedje, G., Athanassiadis, I., Lind sure of aircraft personnel. Chem		lgren, H	.,Jakobsson, K.,Bergman, A 2014. Brominated flame retar	
Data Type Hero ID	Exposure; 2343686	Commerical Use; Insulation pro	educts in airpla	anes ; M	onitoring Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Methodology is well described	
Domain 2: Repre	esentative					
p.	Metric 2:	Geographic Scope	Acceptable	3	Sweden	
	Metric 3:	Applicability	Acceptable	3	Occupational scenario (use of insulation in aircraft). Will be assessed by Exposure Assessors (not Engineering Assessors)	
	Metric 4:	Temporal Representativeness	Acceptable	3	2014	
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics	
D						
Domain 3: Acces	- 1	-	4 , 11			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
D	1 '1', 1 TT					
Domain 4: Varial	-	-	A	9		
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.1		
Extracted			Yes			
			- EXTRACT	PION		
Parameter		Data				
Physical Form:			$\operatorname{dust}$			
Route of Exposure:		Inhalation	Inhalation			
Exposure Concentration (Unit):			0.49 to $490$ pmol/m <sup>3</sup>			
Number of Samp			9			
Type of Measure		thod:	Concentration			
Worker Activity:			-	ing mai	ntenancework - locations in Table 1	
Type of Sampling	g:		area			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:  Data Type	dant expos Exposure;	Strid, A., Smedje, G., Athanassiadis, I., Lindgren, T., Lundgren, H., Jakobsson, K., Bergman, A 2014. Brominated flame retardant exposure of aircraft personnel. Chemosphere. Exposure; Consumer Use; Insulation products in homes; Monitoring Data;								
Hero ID	2343686									
Domain		Metric	Rating	Score	Comments					
Domain 1: Relial	bility									
	Metric 1:	Methodology	Acceptable	3	Methodology is well described					
Domain 2: Repre	esentative									
-	Metric 2:	Geographic Scope	Unacceptable	4	$\operatorname{Egypt}$					
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (settled dust in homes). No associated worker activites. $$					
	Metric 4:	Temporal Representativeness	Acceptable	3	2015					
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics					
Domain 3: Acces	sibility/Clar	rity								
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.					
Domain 4: Varial	bility and H	ncort aint v								
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.					
Overall Quality I	Determinatio	* on	Unacceptable	4.0						
o verair square, i				1,0						
Extracted			Yes							
			- EXTRACTION	ON —						
Parameter		Data								
Physical Form:			settled dust							
Route of Exposur			Inhalation							
Exposure Concer	,	it):	median = 6 ng HBCD/g dust							
Worker Activity:			HBCD in dust collected from homes. No associated worker activity.							

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type	Strid, A., Smedje, G., Athanassiadis, I., Lindgren, T., Lundgren, H., Jakobsson, K., Bergman, A. 2014. Brominated flame retardant exposure of aircraft personnel. Chemosphere.  Exposure; Commercial Use; Insulation products in offices; Monitoring Data;								
Hero ID	2343686	Commercial Ose, insulation pro	ducts in offices,	Momeon	Ing Dates,				
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Methodology is well described				
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Unacceptable	4	Egypt				
	Metric 3:	Applicability	Unacceptable	4	Occupational scenario (use of insulation in offices). No associated worker activities. $$				
	Metric 4:	Temporal Representativeness	Acceptable	3	2015				
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics				
Domain 3: Acces	sibility/Clar	city							
Domain o. Neces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.				
Domain 4: Varial	hility and H	neortainty							
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.				
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0					
•			1						
Extracted			Yes						
			- EXTRACTION	NC					
Parameter			Data						
Physical Form:			settled dust						
Route of Exposu	re:		Inhalation						
Exposure Concer	tration (Un	it):	median = 19 n	g HBCI	D/g dust				
Worker Activity:			HBCD in dust collected from offices. No associated worker activities.						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:				en, H.,J	akobsson, K.,Bergman, A 2014. Brominated flame retar-		
Data Type Hero ID	-	sure of aircraft personnel. Chem Consumer Use; Insulation produ	•	nitoring	Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Methodology is well described		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Unacceptable	$_4$	Egypt		
	Metric 3:	Applicability	Unacceptable	4	Non-occupational scenario (settled dust in cars). No associated worker activites.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2015		
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics		
TD	3.32 /61	•,					
Domain 3: Acces	Metric 6:	nty Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
T							
Domain 4: Varial	-	-	A	9			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
		*					
Overall Quality I	Determination	on	Unacceptable	4.0			
Extracted	Extracted						
			- EXTRACTION	ON —			
Parameter			Data				
Physical Form:			settled dust				
Route of Exposu	re:		Inhalation				
Exposure Concer	,	it):	median = 37 ng HBCD/g dust				
Worker Activity:			HBCD in dust collected from cars. No associated worker activities.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		shop floors of four major e-wast			X 2016. Organohalogen pollutants in surface particulates a and implications for emission lists. Science of the Total
Data Type Hero ID	Exposure; 3350480	Disposal; Disposal of Waste of l	Electric and Elec	tronic E	Equipment (WEEE); Monitoring Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Methodology is well described
Domain 2: Repre	esentative				
-	Metric 2:	Geographic Scope	Unacceptable	4	China (non-OECD country)
	Metric 3:	Applicability	Unacceptable	4	Out of scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Acceptable	3	Indicates number of samples and provides several statistics
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0	
Extracted			Yes		
			- EXTRACTION	NC	
Parameter			Data		
Physical Form:			Dust		
Route of Exposu	re:		Inhalation		
Exposure Concer		it):	555700  ng/g dy	ust	
Number of Sites:	(	,	4		
Worker Activity:			HBCD in dust	collecte	d from floors of e-waste facilities

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:		hem, Corp. 1978. Industrial hyg semi-works summary with attach			emical Corporation, El Dorado, Ark Plant, Fire Master 680
Data Type Hero ID		Manufacturing; HBCD manufac			312816.
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	data or techniques that are high quality
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable	3	Manufacturing is out of scope, but this information may be applicable to import
	Metric 4:	Temporal Representativeness	Unacceptable	4	1978
	Metric 5:	Sample Size	Unacceptable	4	Sample statistics not discussed, however, since this is an IH survey it can be assumed that this was considered.
Domain 3: Acces	sibility/Cla	$\operatorname{rity}$			
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determination	on*	Medium	2.1	
Extracted			Yes		
			- EXTRACTI	ON —	
Parameter			Data		
Physical Form:			Dust		
Route of Exposu	re:		Inhalation		
Exposure Concer	ntration (Un	it):	1.9  mg/m3		
Number of Sites:			1		
Type of Measure		thod:	Industrial hygi		
Worker Activity:			Transfer of the	HBCD	in the hammer-mill to 28 drums
Number of Work			1		
Exposure Duration	on:		300 minutes (5		
PPE:			Respiratory pr goggles or glov		but no other dermal and eye protection (such as e worn
		(	Continued on nex	t page	

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		oncinaca nom p	evious pus				
Study Citation:	Velsicol Chem, Corp. 1978. Industrial hygiene survey, Velsicol Chemical Corporation, El Dorado, Ark Plant, Fire Master 680 Unit and semi-works summary with attachments and cover letter dated 071978.						
Data Type Hero ID	Exposure; Manufacturing; HBCD manu 1928232	ufacture; Monitorii	ng Data;				
Domain	Metric	Rating	Score	Comments			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:		J. G.,Jin, J.,Zhu, J 2016. As a China. Chemosphere.	sessment of the	occupati	ional and environmental risks of hexabromocyclododecane
Data Type Hero ID			n; Reports for D	ata or Iı	nformation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
•	Metric 2:	Geographic Scope	Unacceptable	4	China
	Metric 3:	Applicability	Acceptable	3	Manufacturing is out of scope, but this information may be applicable to import
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	oility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	2.1	
Extracted			Yes		
Parameter		- EXTRACTI Data	ON —		
Physical Form:			Dust		
Route of Exposur	re:		Inhalation		
Exposure Concen		it):	10.2  ug/m3  to	28.3 ug	m /m3
Number of Sites:	`	,	14	0,	
Number of Worke	ers:		23 to 37		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	Yi, S.,Liu, J. G.,Jin, J.,Zhu, J 2016. Assessment of the occupational and environmental risks of hexabromocyclodo (HBCD) in China. Chemosphere.							
Data Type Hero ID			teports for Data	or Infor	mation Other than Exposure or Release Data;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
_	Metric 2:	Geographic Scope	Unacceptable	4	China			
	Metric 3:	Applicability	Acceptable	3	in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2016			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Claı	rity						
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial	bility and U	ncertaintv						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n*	Medium	1.9				
Extracted			Yes					
			- EXTRACTION	ON				
Parameter		Data						
Physical Form:			Dust					
Route of Exposur			Inhalation					
Exposure Concen	tration (Un	it):	3.62  ug/m3 to	35.5  ug	$/\mathrm{m}3$			
Number of Sites:			520					
Number of Works	ers:		520 to 1,040					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:			sessment of the	occupat	ional and environmental risks of hexabromocyclododecane
Data Type	Exposure;	n China. Chemosphere. Processing; EPS formulation; R	eports for Data	or Infor	mation Other than Exposure or Release Data;
Hero ID	3350493				
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
Bomain 2. reepre	Metric 2:	Geographic Scope	Unacceptable	4	China
	Metric 3:	Applicability	Acceptable	3	Manufacturing EPS is not in scope, but some information may be applicable to other scenarios that are in scope or may be used as surrogate data
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	cibility/Clar	nit x			
Domain 5. Access	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	bility and H	neartainty			
Domain 4. Variai	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	2.1	
Extracted			Yes		
			- EXTRACTION	ON —	
Parameter			Data		
Physical Form:			Dust		
Route of Exposur	re:		Inhalation		
Exposure Concen	tration (Un	it):	16 ug/m3 to 2	6.7 ug/r	m3
Number of Sites:			65		
Number of Worke	ers:		71 to 136		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium} = \geq 1.7 \text{ to } < 2.4; \text{ Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		azardous Substances Data, Bank All; HBCD; Reports for Data o				
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Unacceptable	4	Toxicity information is relevant to the Risk Assessment, but is not utilized by the engineering assessors	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	sibility/Clar	$\operatorname{ritv}$				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	on —		
Worker Activity:			Provides toxicity data on HBCD. No information extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	7. Hexabromocyclododecane, Pa All; HBCD; Reports for Data of		ther tha	n Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Unacceptable	4	Toxicity information is relevant to the Risk Assessment, but is not utilized by the engineering assessors
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	)n	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTI Data	on —	
Worker Activity:			Provides toxici	ty data	on HBCD. No information extracted.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		14. International chemical safety All; HBCD; Reports for Data o			omocyclododecane (mixture of isomers). n Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliat	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
•	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Unacceptable	4	No information regarding HBCD
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Access	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	hility and H	ncortainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	» n	Unacceptable	4.0	
Extracted			Yes		
Parameter		_	- EXTRACTI Data	ON —	
Worker Activity:			Provides toxic tracted.	ity and	other SDS data on HBCD. No information ex-

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	7. Guidance on safe use: hexabi All; HBCD; Reports for Data of	· ·		n Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
•	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Unacceptable	4	Toxicity information is relevant to the Risk Assessment, but is not utilized by the engineering assessors
	Metric 4:	Temporal Representativeness	Acceptable	3	No Date (cites a soucce from 2006)
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	n*	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTI Data	ON —	
Worker Activity:			Provides toxic tracted.	ity and	other SDS data on HBCD. No information ex-

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	Echa, 200 to its use.	9. Data on manufacture, import	, export, uses a	ınd relea	ses of HBCDD as well as information on potential alternatives
Data Type Hero ID	Exposure; 3809166	All; All; Reports for Data or In	formation Oth	er than	Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
*	Metric 2:	Geographic Scope	Acceptable	3	Multiple European countries
	Metric 3:	Applicability	Acceptable	3	Provides infomration on both in-scope and out of scope uses.
	Metric 4:	Temporal Representativeness	Acceptable	3	2009
	Metric 5:	Sample Size	Acceptable	3	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	fully transparent.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	discussion of variability or uncertainty
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.4	
Extracted			Yes		
Parameter			– EXTRACI Data	TION -	
Type of Measure	ment or Met	thod:	Presents exp	osure da	ata that is presented in EURAR (HERO ID 3970747)

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation:		9. Data on manufacture, import	, export, uses a	ınd relea	ses of HBCDD as well as information on potential alternatives				
Data Type Hero ID	to its use. Exposure; 3809166	Processing; MFG of XPS foam	from XPS Ma	sterbatc	h; Reports for Data or Information Other than Exposure or Release Data;				
Domain	3809100	Metric	Rating	Score	Comments				
Domain 1: Relia	bility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
1	Metric 2:	Geographic Scope	Acceptable	3	Multiple European countries				
	Metric 3:	Applicability	Acceptable	3	Provides infomration on both in-scope and out of scope uses.				
	Metric 4:	Temporal Representativeness	Acceptable	3	2009				
	Metric 5:	Sample Size	Acceptable	3	Distribution of samples is characterized by a range with uncertain statistics. It is unclear if analysis is representative.				
Domain 3: Acces	ssibility/Cla	rity							
	Metric 6:	Metadata Completeness	Acceptable	3	fully transparent.				
Domain 4: Varia	bility and H	ncort aint v							
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	discussion of variability or uncertainty				
Overall Quality l	Determination	n*	High	1.4					
Extracted			Yes						
			EXT	RACT	ION ———				
Parameter			Data						
Exposure Concer	ntration (Un	it):	0.02 - 0.22 n	ng/3					
Number of Samp	oles:		42						
Number of Sites:			4						
Type of Measure		thod:	see Table 2.15						
Worker Activity:				-	to HBCDD during XPS manufacture occurs when				
					oper that feeds into the polystyrene melt. Further				
			-		to HBCDDcontained within polystyrene dust may				
					condary processing of XPS and during the shredding				
			and reproces	sing of	process waste.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:					ane, V. H., Thorud, S., Becher, G., Dybing, E 2007. Occu		
Data Type Hero ID	-	= -		_	nt. Environmental Science and Technology. shed Models for Exposures or Releases;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	The model is free of mathematical errors and is based on scientifically sound approaches or methods.		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	A Scandanavian Industrial Plant. Since all scandanavian countries (Sweden, Denmark, Finland, Norway, Iceland) are in OECD, this score is a 2.		
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS particle size and wt frac		
	Metric 4:	Temporal Representativeness	Acceptable	3	The report was published in 2007 (> 10 years ago)		
	Metric 5:	Sample Size	N/A	N/A	Not applicable for models		
Domain 3: Acces	aibility/Clas						
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Some data is missing such as PV and batch size		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	2.0			
Extracted			Yes				
			- EXTRACTION	ON —			
Parameter			Data				
Process Descript			HBCD particle	es (from	$20~\mathrm{nm}$ to $2~\mathrm{mm})$ are added to EPS batches		
Number of Sites:			110 / 140 1	, ,	(0.40 )		
Operating Days 1	per Year and	d Batches per Day:	112 to 140 days/year (8-10 production periods; each production period lasts 14 days)				
Possible Physical	l Form:		Solid				
Chemical Concer	ntration:		0.7 wt percent	HBCD	in EPS		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		azardous Substances Data, Bank mport; Manufacturing and impo			oromocyclododecane. orts for Data or Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	US		
	Metric 3:	Applicability	Acceptable	3	Importation is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Acceptable	3	Information is from 3 CDR reporting sites, which represents only the sites exceeding the reporting threshold, so maybe not every possible site		
Domain 3: Acces	sibility/Cla	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	Report addresses CBI claims, but not much else		
Overall Quality I	Determination	on <sup>*</sup>	High	1.2			
Extracted			Yes				
			— EXTRA	CTIO	N		
Parameter			Data				
Process Description:			See pg 90 for manufacturing description.				
Total Annual U.S. Volume (and percent of PV):			10 -50 millio	n pound	ds		
Number of Sites:	`	,	3 - 2 import	, 1 MFC	G (2012 CDR)		
Chemical Concer	ntration:		40 to $100$ pe	rcent in	manufactured or imported substance		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Medium=\geq 1.7 \text{ to } < 1.7$ ;  $Medium=\geq 1.7$  to  $\sim 1.7$ 

Study Citation: Nicnas, 2012. Priority existing chemical assessments: Hyexabromocyclododecane (HBCD)- PEC34.  Data Type Facility; Import; Importation of HBCD; Completed Exposure or Risk Assessments;  Hero ID 3978355							
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Australia		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Acceptable	3	Infromation from limited number of outside sources		
Domain 3: Acces	sibility/Clar	itx					
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
D . 4 37	1 '1', 1 11	4 7 4					
Domain 4: Varia		·	A 1.1	2			
	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability		
Overall Quality I	Determinatio	n <sup>*</sup>	High	1.3			
Extracted			Yes				
			- EXTRACT	ΓΙΟΝ -			
Parameter			Data				
Process Description:		Liquid is imported in 200 kg drums or 20 kg steel drums to warehouse then to customers; No repackaging. Solid imported in 25 kg lined paper bags. Same for imported resins. [pg 44]					
Total Annual U.S. Volume (and percent of PV):			0 for so	lid; 0.69 tonnes for liquid; 45 tonnes for EPS resin;			
Possible Physical	Form:		liquid; solid;		PS		
Chemical Concer			15-30 percent or 30-60 percent (liquid); 96-99.96 percent (solid); <1 percent (EPS); <3 percent (XPS)				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		Nicnas,. 2012. Priority existing chemical assessments: Hyexabromocyclododecane (HBCD)- PEC34. Facility; Processing; Production of EPS resin; Completed Exposure or Risk Assessments; 3978355									
Domain		Metric	Rating	Score	Comments						
Domain 1: Relial	bility										
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources						
Domain 2: Repre	esentative										
	Metric 2:	Geographic Scope	Acceptable	3	Australia						
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS use rate						
	Metric 4:	Temporal Representativeness	Acceptable	3	2012						
	Metric 5:	Sample Size	Acceptable	3	Infromation from limited number of outside sources						
Domain 3: Acces	sibility/Clar	rity									
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited						
Domain 4: Varia	bility and U	ncertainty									
	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability						
Overall Quality I	Determinatio	» DII	High	1.6							
Extracted			Yes								
Parameter			– EXTRACTION ———— Data								
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:					detailed process description r insulation (EPS and XPS)						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a rocessing; Panels from EPS; Co		-	mocyclododecane (HBCD)- PEC34. Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources			
Domain 2: Repre	esentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Australia			
	Metric 3:	Applicability	Acceptable	3	Use in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2012			
	Metric 5:	Sample Size	Acceptable	3	Infromation from limited number of outside sources			
Domain 3: Acces	Domain 3: Accessibility/Clarity							
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability			
Overall Quality I	Determinatio	n"	High	1.3				
Extracted			Yes					
Parameter	Parameter			EXTRACTION ————————————————————————————————————				
Process Description:			See section 4.6.1 for detailed process description. Moulded EPS blocks can be shaped at the building site, most often with a bandsaw, or they					
Total Annual U.S	S. Volume (a	and percent of PV):			ctories using hot wire cutting techniques. r insulation (EPS and XPS)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		012. Priority existing chemical a se; XPS Foam board; Completed			mocyclododecane (HBCD)- PEC34. ssessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources		
Domain 2: Repr	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Australia		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Acceptable	3	Infromation from limited number of outside sources		
Domain 3: Acces	sibility/Clar	itv					
Domain o. Trees.	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varia	bility and H	neartainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability		
Overall Quality	Determinatio	$\mathbf{n}^*$	High	1.3			
Extracted			Yes				
			- EXTRACT	ΓΙΟΝ -			
Parameter			Data				
Process Description:		Board dimensions are approximately 600 mm by 300 mm by 2400 mm. Boards are fixed in place by contractors using mechanical fasteners or adhesives. Some boards may be hand-cut to size and shape on-site.Insulated panels are typically clad with steel or aluminium sheet, adhesively bonded to the foam. [pg 45]					
Total Annual U.S. Volume (and percent of PV):					r insulation (EPS and XPS)		
Possible Physica			solid - foam		( /		
Chemical Concentration:			<3 percent				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation: Data Type Hero ID		012. Priority existing chemical ε ecycling; XPS Foam Recycling;			mocyclododecane (HBCD)- PEC34. or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources		
Domain 2: Repre	sentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Australia		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Information is all clearly cited		
Domain 4: Varial	bility and H	naortainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	Limited discussion on uncertainty and variability		
Overall Quality I	Determinatio	*	High	1.2			
Extracted			Yes				
Parameter	Parameter			EXTRACTION ————————————————————————————————————			
Process Description:			A small percentage (<5 percent) is recovered for reuse at the end of a building"s life (estimated at 20 years) [pg 45].				
Possible Physical	Form:		solid - foam		, , , , , , , , , , , , , , , , , , , ,		
Chemical Concen			<3 percent				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	4. Template for third party sub building applications.	mission of inforn	nation o	n alternatives for applications for authorisation HBCD use			
Data Type Hero ID			or Data or Infor	mation (	Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Data from manufacturer, who is also the author of the report		
Domain 2: Repre	esentative						
*	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac and use rate		
	Metric 4:	Temporal Representativeness	Acceptable	3	2014		
	Metric 5:	Sample Size	Unacceptable	4	Qualitative		
Domain 3: Acces	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	The report does not address variability or uncertainty.		
Overall Quality I	Determinatio	on*	Medium	2.0			
Extracted			Yes				
Parameter			– EXTRACTION ———— Data				
Process Description:			HBCD is added to a 50/50 suspension of monomeric Styrene and water, together with other additives (catalysts, nucleation agents, etc.). HBCD dissolves in the styrene which is polymerized into the small Polystyrene beads. During polymerization a blowing agent is added.				
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:			heads. During polymerization a blowing agent is added. HBCD demand $(2015) = 2,200$ metric ton 0.5 percent -1.0 percent				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High = 2 1 to < 1.7; Medium = 2 1.7 to < 2.4; Low = 2 2.4 to < 3.

Study Citation:		4. Template for third party sub-	mission of inforn	nation of	n alternatives for applications for authorisation HBCD use			
Data Type Hero ID		0 11	Masterbatch; Re	eports fo	or Data or Information Other than Exposure or Release Data;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Data from manufacturer, who is also the author of the report			
Domain 2: Repres	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2014			
	Metric 5:	Sample Size	Unacceptable	4	Qualitative			
Domain 3: Access	sibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Data sources are generally described but not fully transparent.			
Domain 4: Varial	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	The report does not address variability or uncertainty.			
Overall Quality I	Determination	n*	Medium	1.8				
Extracted			Yes					
Parameter	Parameter			— EXTRACTION ————————————————————————————————————				
Process Description:			The XPS process makes use of a two-step extrusion process. It starts from polystyrene which is blended with the flame retardant in a first step and the addition of a blowing agent in a second step. Leaving the second extruder, the product expands into sheets which are cut in shape.					
Chemical Concen	tration:		1.5 -2.5 percen					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Medium=\geq 1.7 \text{ to } < 1.4$ ;  $Medium=\geq 1.4$  to  $Medium=\geq 1.4$ ;  $Medium=\geq 1.4$  to  $Medium=\geq 1$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromocrocessing; EPS Resin; Complete	·	isk Asse	essments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources
Domain 2: Repre	sentative				
-	Metric 2:	Geographic Scope	Acceptable	3	Swedish Chemicals Agency
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS use rate
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	n*	High	1.6	
Extracted			Yes		
Parameter			- EXTRACTI Data	ON —	
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Section 2.2.3.1 See Table 2-3 f See Table 2-3 f		•

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromorocessing; EPS Foam from Resing.	·	posure (	or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources		
Domain 2: Repre	sentative						
-	Metric 2:	Geographic Scope	Acceptable	3	Swedish Chemicals Agency		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.3			
Extracted			Yes				
			— EXTRACTION —				
Parameter		Data					
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:		and percent of PV):	Section 2.2.3.2 See Table 2-3 for European Value See Table 2-3 for European Value				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromorocessing; XPS Compounding /		$_{ m omplete}$	d Exposure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources
Domain 2: Repre	esentative				
1	Metric 2:	Geographic Scope	Acceptable	3	Swedish Chemicals Agency
	Metric 3:	Applicability	Acceptable	3	Use in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.3	
Extracted	Extracted				
		EXTRACTION —			
Parameter		Data			
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:		Section 2.2.4.1 See Table 2-3 for European Value See Table 2-3 for European Value			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	8. Risk assessment: hexabromorocessing; Production of XPS ar	·	d Expos	sure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Swedish Chemicals Agency	
	Metric 3:	Applicability	Acceptable	3	Use in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.	
Domain 3: Acces	sibility/Clar					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	* vn	High	1.3		
Extracted			Yes			
13701 0000 d						
Parameter	Parameter		- EXTRACTION Data			
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites:			Section 2.2.4.2 See Table 2-3 for European Value See Table 2-3 for European Value			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexa rocessing; EPS articles from bea			d all major diastereoisomers identified. e or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	bility						
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources		
Domain 2: Repre	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2009?		
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rit.v					
Domain of Trees.	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	hilitar and II						
Domaii 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality l	Determinatio	on*	High	1.3			
Extracted			Yes				
Parameter			– EXTRACTION ————————————————————————————————————				
Process Description:		EPS pellets are converted to expanded beads using steam. The expanded beads can then be moulded into boards and shapes (e.g. insulation boards). The temperature softens the beads and the expansion of blowing agent they contain (i.e. pentane) causes the pellets/beads to expand up to 50 times their original size. More details in Section 9.3.1.1					
Total Annual U.S. Volume (and percent of PV):			10 percent of EU tonnage				
Operating Days per Year and Batches per Day: Site Daily Throughput:		?230 days/yr ?391 kg/day; ?90 tonnes/yr (of HBCDD, equivalent to approximately 13 000 tonnes EPS)					
Possible Physical	l Form:		Solid (within polymer matrix)				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	ŭ I			d all major diastereoisomers identified. ticles.; Completed Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information collected from accepted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	sources are 2009 - 2012		
	Metric 5:	Sample Size	Unacceptable	4	Distribution characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on*	High	1.3			
Extracted			Yes				
Parameter		EXTRACTION ————————————————————————————————————					
Process Description:		In construction applications, use of FR EPS reduces costs in transport, handling and overall construction time to insulate buildings.					
Total Annual U.S	S. Volume (a	and percent of PV):	20 percent of EU tonnage				
Operating Days per Year and Batches per Day:			250				
Site Daily Throu			3.2  kg/d; 0.8  t/a				
Possible Physical	Form:		Solid (within p	olymer	matrix)		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		7. Chemical safety report: Hexarocessing; formulation of EPS b			d all major diastereoisomers identified, Part 2. re or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Demain 1. Deliel	L:11:4					
Domain 1: Relial	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
•	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac and use rate	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	${\bf Unacceptable}$	4	characterized by no statistics.	
Domain 3: Acces	ssibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.6		
Extracted			Yes			
Parameter			– EXTRACTI Data	on —		
Process Description:  Total Annual U.S. Volume (and percent of PV): Operating Days per Year and Batches per Day: Site Daily Throughput: Chemical Concentration:		The reactor content is heated (and stirred) and during polymerisation, pentane (the expansion agent) is added to the reactor under pressure, where it is absorbed in the polymer droplets. The HBCDD is incorporated as an integral and encapsulated component within the polymer matrix with uniform concentration throughout the bead. See additional detailed description in Section 9.2.  24 percent for EU ?330 days ?2.91 t/d; ?960 t/y				
		(	0.70 percent  Continued on nex	rt nage		
				r hage		

## - continued from previous page

		memaca nem p	evious page	
Study Citation: Data Type Hero ID	Echa, 2017. Chemical safety report: Efficiency Facility; Processing; formulation of EP 3970753	·		•
Domain	Metric	Rating	Score	Comments

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	9. Background document for he rocessing; formulation of EPS b	· ·		and all major diastereoisomers identified. re or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac and use rate
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	» Dn	High	1.7	
Extracted			Yes		
Parameter		_	– EXTRACTI Data	ON —	
Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			5,300 Tonnes/y 22 0.70 percent	yr (EU)	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	9. Background document for he rocessing; formulation of XPS; 0			and all major diastereoisomers identified. Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	ritv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U:	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	»	High	1.4	
Extracted			Yes		
			- EXTRACTION	ON	
Parameter			Data		
Total Annual U.S	S. Volume (a	and percent of PV):	5,900 Tonnes/	vr (EU)	
Number of Sites:		* · /·	56	, (= - )	
Chemical Concen	tration:		0.70 percent		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ 

Study Citation: Data Type Hero ID	,	9. Background document for he rocessing; EPS converting; Com	· ·		and all major diastereoisomers identified. Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliat	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2009
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	oility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	n*	High	1.4	
Extracted			Yes		
Parameter		_	– EXTRACTI Data	on —	
Number of Sites:			600		
Chemical Concen	tration:		0.70 percent		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		enics. 2017. Analysis of alternat rocessing; EPS bead production			EPS for building applications. Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac		
	Metric 4:	Temporal Representativeness	Acceptable	3	Sources are 2003 or more recent		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	n*	High	1.6			
Extracted			Yes				
Parameter			- EXTRACT Data	TION -			
Process Description:			There are two single-step processes, the suspension process and the mass process. The suspension process is described first in 2.1.1.1, with key differences in the mass process described in 2.1.1.2. HBCD pre-added to styrene or added to reactor during polymerization. An expansion agent, pentane, is added to the reactor during polymerisation (at a temperature of approximately 130oC) and is absorbed by the polymer droplets. EPS pellets formed and are dried.				
Chemical Concen	ntration:		0.70 percent		ac uncu.		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}{=}\geq 1$  to < 1.7;  $\text{Medium} = \geq 1.7$  to < 2.4;  $\text{Low} = \geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		enics. 2017. Analysis of alternat rocessing; EPS foam from pellet			EPS for building applications. Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repres	sentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	Sources are 2003 or more recent		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Access	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Variab	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality D	Determinatio	n*	High	1.4			
Extracted			Yes				
Parameter			- EXTRACT Data	TION –			
Process Description:			The EPS pellets are converted to expanded beads using steam. The expanded beads can then be moulded into boards and shapes (e.g. insulation boards, specific shapes for packaging). The steps are further described in Section 2.1.3.				
Chemical Concentration:			0.70 percent				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			emical problem f	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster
Data Type Hero ID	flame retain Facility; P: 3809277		ports for Data or	Informa	ation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	ritv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	* on	High	1.2	
			0		
Extracted	***************************************		Yes	***************************************	
Parameter		_	– EXTRACTI Data	ON —	
Process Description: Total Annual U.S. Volume (and percent of PV): Chemical Concentration:			Used for interi 45 percent 0.5	or insula	ation

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P.		emical problem f	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster
Data Type Hero ID	Facility; P: 3809277	rocessing/Use; XPS boards; Rep	oorts for Data or	Informa	ation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
Domain I. Varia	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.2	
Extracted			Yes		
Parameter			– EXTRACTI Data	on —	
Process Description:		XPS foam board is used mainly for roofing applications and architectural molding			
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:		51 percent 0.5 to 1			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	U.S, E. P. flame retain		mical problem fo	ormulati	on and initial assessment. Cyclic aliphatic bromide cluster	
Data Type Hero ID	Facility; Ir 3809277	nport; Importation of HBCD (n	ot in articles); R	eports f	or Data or Information Other than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
_	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Access	sibility/Clar	itv				
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	hility and H	ncertainty				
Domain 1. Varia	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.	
Overall Quality I	Determinatio	on*	High	1.2		
Extracted			Yes			
			— EXTRACT	ION –		
Parameter			Data			
Total Annual U.S Number of Sites:	5. Volume (a	and percent of PV):	92,270 pounds imported 5 sites manufacture or import			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation:	U.S, E. P. A 2015. TSCA Work Plan chemical problem formulation and initial assessment. Cyclic aliphatic bromide cluster flame retardants.								
Data Type Hero ID	Facility; M 3809277	Ianufacture; Manufacture; Repor	rts for Data or	Inform	ation Other than Exposure or Release Data;				
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	bility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
	Metric 2:	Geographic Scope	Acceptable	3	US				
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but information could possibly be applied to import /repackaging				
	Metric 4:	Temporal Representativeness	Acceptable	3	2012				
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics				
Domain 3: Acces	sibility/Cla	rity							
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.				
Domain 4: Varia	bility and U	ncertainty							
	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.				
Overall Quality I	Determinatio	n*	High	1.3					
Extracted	Extracted								
			- EXTRAC	rion -					
Parameter			Data						
Total Annual U.S	S. Volume (a	and percent of PV):	4.54E+06 to	2.29E+	-07 kg/yr				
Number of Sites:		1 //-	3	,	O, v				
Operating Days	ner Year and	l Batches per Day:	250						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:			mical problem	formul	ation and initial assessment. Cyclic aliphatic bromide cluster
Data Type Hero ID	flame retain Facility; P 3809277		r Data or Info	rmation	Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS use rate
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	oility and U	ncertainty			
Domain II Varia	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	» Dn	High	1.3	
Extracted			Yes		
			- EXTRACT	TION -	
Parameter			Data		
Total Annual U.S	S. Volume (a	and percent of PV):	2.043E+06 t	o 1.0311	E+07 kg/yr
Number of Sites:		• //-	1 to 4		. 0, 0
	oer Vear and	l Batches per Day:	250		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

ne retar ility; Pr 9277			r Inforn	nation Other than Exposure or Release Data;
			r Inforn	nation Other than Exposure or Release Data;
9277	Metric			
	Metric			
		Rating	Score	Comments
tric 1:	Methodology	Acceptable	3	Information is from trusted sources
ative				
tric 2:	Geographic Scope	Acceptable	3	US
tric 3:	Applicability	Acceptable	3	Use is in scope
tric 4:	Temporal Representativeness	Acceptable	3	2012
tric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics
tr./Clan				
tric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
and Ur	acort ainty			
tric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.
. ,.	*	77' )	4 4	
minatio	n	High	1.1	
		Yes		
		- EXTRACT	rion -	
		Data		
lume (a	nd percent of PV):	2.043E+06 t	o 1.0311	E+07 kg/yr
`	- /	5 to 15		
ear and	Batches per Day:	250		
	ative bric 2: bric 3: bric 4: bric 5: bric 6: and Ur bric 7: minatio	ative tric 2: Geographic Scope tric 3: Applicability tric 4: Temporal Representativeness tric 5: Sample Size  ty/Clarity tric 6: Metadata Completeness  and Uncertainty	attive tric 2: Geographic Scope Acceptable tric 3: Applicability Acceptable tric 4: Temporal Representativeness Acceptable tric 5: Sample Size Acceptable  try/Clarity tric 6: Metadata Completeness Acceptable  and Uncertainty tric 7: Metadata Completeness Acceptable  mination*  High  Yes  —————————————————————————————————	attive tric 2: Geographic Scope Acceptable 3 tric 3: Applicability Acceptable 3 tric 4: Temporal Representativeness Acceptable 3 tric 5: Sample Size Acceptable 3  try/Clarity tric 6: Metadata Completeness Acceptable 3  and Uncertainty tric 7: Metadata Completeness Acceptable 3  mination* High 1.1  Yes  —————————————————————————————————

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			emical problem	ı formul	ation and initial assessment. Cyclic aliphatic bromide cluster					
D	flame retai			, ,						
Data Type Hero ID	Facility; P 3809277	rocessing; manufacture of XPS u	PS using HBCD powder (not masterbatch); Reports for Data or Information Other than Exposure or Release Dat							
Domain		Metric	Rating	Score	Comments					
Domain 1: Relia	bility									
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources					
Domain 2: Repre	esentative									
p.	Metric 2:	Geographic Scope	Acceptable	3	US					
	Metric 3:	Applicability	Acceptable	3	Use is in scope					
	Metric 4:	Temporal Representativeness	Acceptable	3	2012					
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics					
Domain 3: Acces	eibility/Cla	ritz								
Domain 5. Acces	- /	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.					
Domain 4: Varia	bility and H	neartainty								
Domain 4. varia	·	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.					
Overall Quality 1	Determinatio	nn*	High	1.1						
Overall Quality 1	Determination	м	mgn	1.1						
Extracted			Yes							
				— EXT	RACTION ———					
Parameter			Data							
Total Annual U.S	S. Volume (a	and percent of PV):	2.316.E+06	to 1.168	3.E+07  kg/yr					
Number of Sites:			6 to 18							
Operating Days	per Year and	d Batches per Day:	250							

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	,		mical probler	n formul	lation and initial assessment. Cyclic aliphatic bromide cluster
Data Type	flame retar Facility; Pr		styrene resin t	to produ	ice XPS masterbatch containing HBCD; Reports for Data or Information Other than Exposure
Hero ID	3809277				
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre					
Domain 2. reepre	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable		Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable		2012
	Metric 5:	Sample Size	Acceptable		characterized by a range with uncertain statistics
T : 0 A		•			
Domain 3: Acces		-	Atable	9	
	Metric o:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
~					
Domain 4: Varia	-		A 4 - 1 - 1 -	9	
	Metric ι:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.
	~	*	TT: 1	4 4	
Overall Quality I	Determinatio	<u>m</u>	High	1.1	
Extracted			Yes		
					— EXTRACTION —
Parameter			Data		
Total Annual U.S	5. Volume (a	and percent of PV):	2.316.E+06	to 1.16ε	8.E+07 kg/yr
Number of Sites:	,	*	10 to 29		
Operating Days 1	per Year and	d Batches per Day:	250		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to < 1.7;  $\text{Medium}=\geq 1.7$  to < 2.4;  $\text{Low}=\geq 2.4$  to < 3.

Study Citation:	flame retardants.							
Data Type Hero ID	Facility; P: 3809277	rocessing; XPS converting; Repo	orts for Data o	or Inforn	nation Other than Exposure or Release Data;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	US			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2012			
	Metric 5:	Sample Size	Acceptable	3	characterized by a range with uncertain statistics			
Domain 3: Acces	sibility/Clar	itv						
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	hility and H	ncertainty						
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.			
Overall Quality I	) otamo in atia	*	Himb	1.1				
Overan Quanty 1	eterminatio	0.00	High	1.1				
Extracted			Yes					
			- EXTRACT	ΓΙΟΝ -				
Parameter		Data						
Total Annual U.S	S. Volume (a	nd percent of PV):	2.316.E+06	to 1.168	.E+07 kg/yr			
Number of Sites:		* /	10 to 24		. G/ v			
	37	l Batches per Day:	250					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3$ .

Study Citation: Data Type Hero ID		mmary risk assessment report: l rocessing; Formulation of flame-	· ·		e. for XPS; Completed Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varia	bility and H	ncortainty					
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	* on	High	1.4			
Overall spanier.			111011				
Extracted			Yes				
			- EXTRACTION	ON —			
Parameter			Data				
Process Descript	ion:		taken from 200	)8 EU as	ssessment (HERO 3970747)		
		and percent of PV):	1700  tons/yr		(		
Number of Sites:		1 /.	>14				
Chemical Concer	tration:		40 percent in compound				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: larger rocessing; Formulation of flame-			e. mpleted Exposure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
•	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac and use rate
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	ssibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	n*	High	1.7	
Extracted			Yes		
Parameter	Parameter		- EXTRACTI Data	ON —	
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			taken from 200 3400 tons/yr >18 0.7 percent in		ssessment (HERO 3970747) ads

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		mmary risk assessment report: I rocessing; Industrial use of EPS			e. retarded EPS; Completed Exposure or Risk Assessments;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	n*	High	1.4				
Extracted			Yes					
Parameter	Parameter			on —				
Process Descripti	Process Description:			taken from 2008 EU assessment (HERO 3970747)				
		and percent of PV):	3400  tons/yr		,,			
Number of Sites:		,	hundreds					
Chemical Concer	tration:		0.7 percent in foam					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3$ .

Study Citation: Data Type Hero ID		mmary risk assessment report: I rocessing; Industrial use of HBC			e. produce flame-retarded XPS; Completed Exposure or Risk Assessments			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	itv						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and U	ncertainty						
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	* on	High	1.4				
Extracted			Yes					
			EXTR	ACTIO	DN			
Parameter			Data					
Process Descripti Total Annual U.S Number of Sites: Chemical Concen	and percent of PV):	taken from 2008 EU assessment (HERO 3970747) 1700 tons/yr 17 1 to 3 percent in foam						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		ummary risk assessment report: I			ne. ce flame-retarded XPS; Completed Exposure or Risk Assessments;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	sibility/Cla	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	oility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.4	
Extracted			Yes		
			— EXTRAC	CTION	
Parameter			Data		
Process Descripti	on:		taken from 200	08 EU as	ssessment (HERO 3970747)
*		and percent of PV):	3200  tons/yr		
Number of Sites:	(-	P	18		
Chemical Concen	tration:		0.5 to 3 percen	nt in foar	m
——————————————————————————————————————	tration:		U.5 to 5 percen	it in ioal	111

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation:		11. Proposal for identification on the control of t			Cat 1 or 2, PBT, vPvB, or a substance of an equivalent
Data Type Hero ID		se; EPS foam for construction;			
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Cla	rity			
Domain 5. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	* on	High	1.4	
Extracted			Yes		
Parameter	Parameter		- EXTRACTI Data	ON —	
Process Description: Total Annual U.S. Volume (and percent of PV):			420,000 tonnes	s of EPS cent is f	ssessment (HERO 3970747) S is used /yr; 170 000 of this is used in Eastern dame retarded); 250 000 tonnes of EPS in Western rded)

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	,	1			Cat 1 or 2, PBT, vPvB, or a substance of an equivalent		
Data Type Hero ID		ncern: Proposal for identification rocessing; Formulation of flame-			for XPS; Completed Exposure or Risk Assessments;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	Use is in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2008		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U:	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determinatio	* n	High	1.4			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			taken from 200 1700 tons/yr >14 40 percent in o		ssessment (HERO 3970747)		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation:  Data Type Hero ID	en: Echa, 2011. Proposal for identification of a substance as a CMR Cat 1 or 2, PBT, vPvB, or a substance of an equivalent level of concern: Proposal for identification of hexabromocyclododecane as a SVHC.  Facility; Processing; Formulation of flame-retarded EPS beads; Completed Exposure or Risk Assessments; 3970757							
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
ı	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac and use rate			
	Metric 4:	Temporal Representativeness	Acceptable	3	2008			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.7				
Extracted			Yes					
Parameter	Parameter			on —				
Total Annual U.S. Volume (and percent of PV): Number of Sites:			taken from 200 3400 tons/yr >18 0.7 percent in		ssessment (HERO 3970747)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:		=			Cat 1 or 2, PBT, vPvB, or a substance of an equivalent	
Data Type Hero ID		ncern: Proposal for identification rocessing; Industrial use of EPS			retarded EPS; Completed Exposure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality I	Determinatio	*	High	1.4		
Extracted			Yes			
Parameter		— EXTRACTION ———— Data				
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			taken from 2008 EU assessment (HERO 3970747) 3400 tons/yr hundreds 0.7 percent in foam			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation:		_			Cat 1 or 2, PBT, vPvB, or a substance of an equivalent
Data Type Hero ID		ncern: Proposal for identification rocessing; Industrial use of HBC			produce flame-retarded XPS; Completed Exposure or Risk Assessments:
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Cla	itv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality l	Determinatio	» On	High	1.4	
Extracted			Yes		
			EXTR	ACTIO	)N
Parameter			Data		<del></del>
Process Descript	ion:		taken from 200	08 EU as	ssessment (HERO 3970747)
•		and percent of PV):	1700 tons/yr		(
Number of Sites:	,	1 /-	17		
Chemical Concentration: 1 to 3 percent in foam					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type	level of cor	ncern: Proposal for identification	of hexabromoc	yclodod	Cat 1 or 2, PBT, vPvB, or a substance of an equivalent ecane as a SVHC. ce flame-retarded XPS; Completed Exposure or Risk Assessments;	
Hero ID	3970757					
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Acceptable	3	Use is in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2008	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion	
Overall Quality I	Determinatio	* on	High	1.4		
Extracted			Yes			
			— EXTRAC	CTION		
Parameter			Data			
Process Description: Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:			taken from 2008 EU assessment (HERO 3970747) 3200 tons/yr 18 0.5 to 3 percent in foam			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,		N .	,	rity existing chemical assessment report no. 20. rmation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relia	ability				
	Metric 1:	Methodology	Acceptable	3	From trusted source
Domain 2: Repr	resentative				
Bollium 2, Itopi	Metric 2:	Geographic Scope	Acceptable	3	Australia
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acce	essibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	ability and U Metric 7:	ncertainty Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality	Determination	m*	High	1.4	
Extracted			Yes		
Parameter			- EXTRACT Data	rion -	
Process Description:			Formulation of resins containing the flame-retardant chemicals consists of weighing or pumping, mixing and blending, processing/extrusion and cutting and packaging of the granular pellets or liquid resins. The PBFRs are compounded with the appropriate polymer (polypropylene or polystyrene) to produce a masterbatch containing up to 30 percent of the flame-retardant. It is possible that more than one flame-retardant chemical may be used in the formulation process.		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		-	,	,	rity existing chemical assessment report no. 20. Reports for Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	From trusted source
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Australia
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario
	Metric 4:	Temporal Representativeness	Acceptable	3	2001
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Access		-		_	
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	oility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	The assessment addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.4	
Extracted			Yes		
			EXTI	RACTI	ON ———
Parameter			Data		
			Continue	d on nex	tt page

## - continued from previous page

			10-
Study Citation: Data Type Hero ID		, , ,	xisting chemical assessment report no. 20. rts for Data or Information Other than Exposure or Release Data
Domain	Metric	Rating Score	Comments
Process Descript	on:	polymeric material are tra is a manual process, when tipping the drums or bag quantities of flame retard either via a closed transfe collar or under local exha material is discharged to system or under local exha whereby the mixture is ext which are cooled then cut	ighed amounts of the powdered or granulated ansferred to rotary mixers/blenders. Weighing reby workers transfer the flame retardant by as in specially designed dispensary. Weighed lant, pigment and other additives are added er system or through a chute with a vacuum aust ventilation to remove dust. The blended a collection bin, usually either in an enclosed aust ventilation and transferred to an extruder, truded under high temperatures to form strips, into small pellets or granules with the desired tardant. These are bagged and dispatched to

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7; Medium  $=\geq 1.7$  to < 2.4; Low  $=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,	Oecd,. 2015. Emission scenario document on use of adhesives. Facility; Use; Adhesives; Reports for Data or Information Other than Exposure or Release Data; 3833136							
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	From trusted sources				
Domain 2: Repre	esentative								
	Metric 2:	Geographic Scope	Acceptable	3	OECD				
	Metric 3:	Applicability	Unacceptable	4	out of scope				
	Metric 4:	Temporal Representativeness	Acceptable	3	2015				
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type				
Domain 3: Acces	sibility/Claı Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.				
Domain 4: Varial	bility and U	ncertainty							
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.				
Overall Quality I	Determinatio	on*	Unacceptable	4.0					
Extracted			Yes						
Parameter		_	- EXTRACTI Data	ON —					
Process Descripti	Process Description:			scope th	erefore no data extraction.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3$ .

Study Citation: Data Type Hero ID	,	4. Emission scenario document se; textile finishing; Reports for		0	her than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	From trusted sources		
Domain 2: Repre	sentative						
1	Metric 2:	Geographic Scope	Acceptable	3	OECD		
	Metric 3:	Applicability	Unacceptable	4	out of scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Access	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Variab	oility and U	ncertainty					
Domain 4. Variati	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.		
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0			
Extracted			Yes				
Parameter		-	- EXTRACTI Data	ON —			
Process Descripti	Process Description:			This is out of scope therefore no data extraction.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		5. Emission scenario documents se; Paints and coatings; Reports	_	- \-	aints, lacquers and varnishes). n Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	From trusted sources
Domain 2: Repre	sentative				
•	Metric 2:	Geographic Scope	Acceptable	3	OECD
	Metric 3:	Applicability	Unacceptable	4	out of scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2009
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	Addresses variability and uncertainty in the results. Uncertainty is well characterized.
Overall Quality I	Determinatio	* on	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTI Data	on —	
Process Descripti	on:		This is out of scope therefore no data extraction.		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3$ .

Study Citation: Data Type Hero ID		9. Prioritisation and Annex XI nport; Import; Reports for Data	_					
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted source (ECHA)			
Domain 2: Repre	sentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Use is in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2007			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	ritv						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and U	ncertainty						
Domain 4. Varia	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	» DD	High	1.7				
Extracted			Yes					
Parameter	Parameter			— EXTRACTION ———— Data				
Process Description:			Net Imports. Not including imports in articles. In all products HBCDD is uniformly incorporated as an integral encapsulated component within the polymer matrix; however it is not bound to the matrix or transformed.					
Total Annual U.S	S. Volume (a	and percent of PV):	6,000  tonnes/y	r (EU -	2007)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation: Data Type Hero ID	Echa, 2009. Prioritisation and Annex XIV background information: hexbromocyclododecane. Facility; Processing; EPS formulation; Reports for Data or Information Other than Exposure or Release Data; 3970759							
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted source (ECHA)			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	EPS compounding not in scope but may provide insight into EPS wt frac and use rate			
	Metric 4:	Temporal Representativeness	Acceptable	3	2006			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Clar	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varia	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion			
Overall Quality I	Determinatio	on*	Medium	1.9				
Extracted			Yes					
Parameter			- EXTRACTI Data	ON —				
Total Annual U.S. Volume (and percent of PV): Number of Sites:			5,301 tonnes per year (EU - 2006) 21					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		9. Prioritisation and Annex XIV rocessing; XPS formulation; Rep			n: hexbromocyclododecane. ation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted source (ECHA)
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2006
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Access	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U:	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	DII <sup>*</sup>	High	1.7	
Extracted			Yes		
Parameter		– EXTRACTI Data	ON —		
Total Annual U.S. Volume (and percent of PV): Number of Sites:		5,859 tonnes /	yr (EU -	- 2006)	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	,	9. Prioritisation and Annex XIV rocessing; XPS converting; Repo	0		on: hexbromocyclododecane. tion Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted source (ECHA)
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Use is in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	ritv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion
Overall Quality I	Determinatio	n *	High	1.4	
Extracted			Yes		
Parameter			- EXTRACTI Data	on —	
Number of Sites:			35		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation: Data Type Hero ID	,	16. Recycling of plastics contain ecycling; Recycling EPS; Report	0		s. on Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	From trusted source
Domain 2: Repre	esentative				
Bomain 2. respie	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Acceptable	3	Recycling is in scope; however, this process operation is for recycling EPS with the intention of removing HBCD and not utilizing it as a FR.
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varial	bility and U Metric 7:	ncertainty Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	n*	High	1.6	
Extracted			Yes		
Parameter		_	- EXTRACTI Data	ON —	
Process Description:			lated more stri the HBCD. Th achieving the l by chemical re	ingently) te report tow level to a towed to a	mving HBCD; in EU, where HBCD is being regu- ). A process exists to redissolve EPS and remove refers to the Solvolyse process, noting issues with ls of HBCD in the recycled polystyrene required a. Editor"s note: this process, now CreaSolve", achieve well below 100 ppm HBCD (the EU POP

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:	European application		2015. Keeping	fire in cl	heck an introduction to flame retardants used in transport			
Data Type Hero ID			related to the ma	anufactu	re of auto parts; Reports for Data or Information Other than Exposure or Release Data;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	From trusted source			
Domain 2: Repre	esentative							
1	Metric 2:	Geographic Scope	Acceptable	3	Europe			
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario			
	Metric 4:	Temporal Representativeness	Acceptable	3	Unknown, but cites sources as recent as 2013			
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type			
Domain 3: Acces	sibility/Cla	rity						
	Metric 6:	-	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.			
Domain 4: Varial	bility and H	naortainty						
Domain 4. varia	-	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
	27200220		0.1100000p.td.510		1.0 diseases of influently of diseases.			
Overall Quality I	Determination	on <sup>*</sup>	High	1.4				
Extracted			Yes					
				EXTR	ACTION ——			
Parameter			Data					
Process Descripti		On average, personal vehicles contain over 105 kg of plastics. Amount of plastics in cars was 16 percent in 2010. The ratio is expected to amount to 18 percent by the end of the decade. The average weight of a vehicle is predicted to decrease to 1,100 kg in 2020 as compared to the 1,400 kg level in 2010.						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:	European flame retai		ndustry, Panel.	2008. I	EBFRIP statement RE UBA's publication on brominated
Data Type Hero ID	Facility; U 3986544	se; Demand in EU; Reports for	Data or Informa	tion Otl	her than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Unacceptable	4	The assessment or report uses data or techniques that are not high quality or not sound science. This is a very biased com- mentary.
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Unacceptable	4	Europe
	Metric 3:	Applicability	Unacceptable	4	Includes out of scope uses and is not applicable to the US
	Metric 4:	Temporal Representativeness	Acceptable	3	2008
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determination	n*	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTION - Data	ON —	
Total Annual U.S	S. Volume (a	and percent of PV):	9,600 tonnes a year in EU		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:		r, M.,Sternbeck, J.,Palm, A.,Kaj ocyclododecane in Sweden. Cher		K.,Brors	ström-Lundén, E 2004. The environmental occurrence of		
Data Type Hero ID	Facility; Ir 1927826	mport; HBCD (neat) import am	ount; Reports for	r Data c	or Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Data from trusted source (Products Register, Swedish National Chemicals Inspectorate)		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Sweden		
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	1.8			
Extracted			Yes				
			- EXTRACTION	N			
Parameter			Data	O.1			
Process Descripti	Process Description:		Net imports. Contains the total tons per year of HBCD imported to Sweden from 1993 to 2000				
Total Annual U.S	5. Volume (a	and percent of PV):		5 -120 tons HBCD per year (Sweden)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:				K.,Bror	ström-Lundén, E 2004. The environmental occurrence of	
Data Type Hero ID		ocyclododecane in Sweden. Cher se; EPS or XPS Foam; Complet		Risk As	sessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Data from trusted source (Products Register, Swedish National Chemicals Inspectorate)	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Sweden	
	Metric 3:	Applicability	Acceptable	3	Information related to in-scope scenario	
	Metric 4:	Temporal Representativeness	Acceptable	3	2004	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Access	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	1.8		
Extracted			Yes			
				N		
Parameter		Data				
Process Description	on:		Amount used per year in EU according to an EU Risk Assessment (The Chemical Inspectorate (KEMI), 2002)			
Total Annual U.S	S. Volume (a	and percent of PV):	-		r year (85 percent of total used in EU)	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		r, M.,Sternbeck, J.,Palm, A.,Kaj ocyclododecane in Sweden. Cher		K.,Brors	ström-Lundén, E 2004. The environmental occurrence of	
Data Type Hero ID	Facility; U 1927826	se; Polymer matrices for cotton	or cotton contai	ning tex	tile matrices; Completed Exposure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Data from trusted source (Products Register, Swedish National Chemicals Inspectorate)	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Acceptable	3	Sweden	
	Metric 3:	Applicability	Unacceptable	4	Textiles are not in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2004	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Cla	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determination	on <sup>*</sup>	Unacceptable	4.0		
Extracted			Yes			
			- EXTRACTION	ON		
Parameter			Data			
Process Descripti	ion:		Amount used per year in EU according to an EU Risk Assessment (The Chemical Inspectorate (KEMI), 2002)			
Total Annual U.S	S. Volume (a	and percent of PV):	1,000 tons HBCD per year (10 percent of total used in EU)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		r, M.,Sternbeck, J.,Palm, A.,Kaj ocyclododecane in Sweden. Cher		K.,Bror	ström-Lundén, E 2004. The environmental occurrence of	
Data Type Hero ID	Facility; U 1927826	se; HIPS (plastics for electronic	devices); Compl	eted Ex	posure or Risk Assessments;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Data from trusted source (Products Register, Swedish National Chemicals Inspectorate)	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Sweden	
	Metric 3:	Applicability	Unacceptable	4	HIPS are not in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2004	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on*	Unacceptable	4.0		
Extracted			Yes			
			- EXTRACTION	 ON		
Parameter			Data			
Process Descripti	on:		Amount used per year in EU according to an EU Risk Assessment (The Chemical Inspectorate (KEMI), 2002)			
Total Annual U.S	S. Volume (a	and percent of PV):			ear (5 percent of total used in EU)	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:					A review of chamber experiments for determining specific	
Data Type Hero ID					dants. Atmospheric Environment. ther than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	UK	
	Metric 3:	Applicability	Unacceptable	4	Manufacture is not in scope and this information is not appli- cable to in-scope scenarios	
	Metric 4:	Temporal Representativeness	Acceptable	3	2013	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
	n.n /cn	•				
Domain 3: Acces		-	A			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
TO	1 '1'' 1 TT					
Domain 4: Varial	-	-				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0		
Extracted			Yes			
Parameter	Parameter		EXTRACTION ————————————————————————————————————			
Process Descripti	Process Description:		Amount manufactured annually in Canada, Netherlands, and UK for			
Total Annual U.S. Volume (and percent of PV):		years 1996 to 2003 Canada - 16,700 to 22,000 metric tons/yrNetherlands - 500 to 7,000 metric tons/yrUK - 1,000 to 5,000 metric tons/yr				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation:		e flame-retardants in the bivalve			2012. In situ accumulation of HBCD, PBDEs, and several d gastropod (Elimia proxima). Environmental Science and		
Data Type Hero ID	Facility; M 1927601	Ianufacture; Manufacture/impor	t; Reports for D	ata or Iı	nformation Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	US		
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but information could possibly be applied to import		
	Metric 4:	Temporal Representativeness	Acceptable	3	2012		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Cla	rity					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	limited discussion		
Overall Quality I	Determination	on <sup>*</sup>	High	1.7			
Extracted			Yes				
			- EXTRACTI	NC			
Parameter			Data				
Process Description:			nisms a	article measured HBCD concentrations in sedit and downstream of a WWTP. Thus, no other			
Total Annual U.S	S. Volume (a	and percent of PV):	4535 and 22 679 tonnes in US (2006)				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:	, ,	, , , , , , , , , , , , , , , , , , , ,	,		cyclododecane in marine species from the Western Scheldt	
Data Type Hero ID			-		Environmental Science and Technology. Data or Information Other than Exposure or Release Data	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Netherlands	
	Metric 3:	Applicability	Acceptable	3	Contains both in-scope and out of scope uses	
	Metric 4:	Temporal Representativeness	Acceptable	3	2001-2005	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibilitv/Clar	itv				
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	well characterized	
Overall Quality I	Determinatio	* n	Medium	1.8		
Extracted			Yes			
Parameter		– EXTRACTI Data	ON —			
Process Description:		Note that this journal article measured HBCD concentrations in fish at a dutch estuary. Thus, no other data was extracted.				
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:		16 700 tons World demand (2001) 0.8 - 4 percent				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:					S. H 2014. Hexabromocyclododecane in polystyrene based		
Data Type Hero ID		products: An evidence of unreguse; EPS and XPS foam; Reports		_	ere. ion Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
	Metric 2:	Geographic Scope	Acceptable	3	Korea		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2014		
	Metric 5:	Sample Size	Acceptable	3	Study contains all concentration sampling data results, from which statistics can be surmised		
Domain 3: Access	sibility/Clar	ritv					
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Acceptable	3	well characterized		
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.1			
Extracted			Yes				
			- EXTRACT	TION -			
Parameter		Data	11011				
	Total Annual U.S. Volume (and percent of PV):		23000 tons w	vorldwic	le		
Possible Physical Form:		foam					
Chemical Concentration:			EPS construction materials = 785181 " 27530 ng/g (i.e., 0.08 percent				
			HBCD w/w); XPS construction = 190.7 " $100 \text{ ng g } 1$ (i.e., 2E-04 percent HBCD w/w)				
				, 			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation:	,	H., Watanabe, M., Kajiwara, N			navior of hexabromocyclododecanes during incineration of on foams. Chemosphere.
Data Type Hero ID	Facility; U 2343703	se; EPS and XPS foam; Reports	s for Data or Infe	ormation	n Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Japan
	Metric 3:	Applicability	Acceptable	3	in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2014
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
<u></u>	Metric 7:	Metadata Completeness	Acceptable	3	well characterized
Overall Quality I	Determinatio	» m	High	1.3	
Extracted			Yes		
Parameter	Parameter		– EXTRACTI Data	ON —	
Total Annual U.S. Volume (and percent of PV): Chemical Concentration:				metric tonnes worldwide (2011) 2.5 percent (XPS)	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1 \text{ to } < 1.7$ ;  $Medium=\geq 1.7 \text{ to } < 2.4$ ;  $Low=\geq 2.4 \text{ to } < 3.$ 

Study Citation:					mocyclododecanes (HBCDDs) in surface soils from coastal s and industrial activities. Chemosphere.	
Data Type Hero ID				-	n Other than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
	Metric 2:	Geographic Scope	Unacceptable	4	China	
	Metric 3:	Applicability	Acceptable	3	in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2011	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	eibility/Cla	rity				
Domain 6. Acces	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.	
Domain 4: Varial	bility and H	ncortainty				
Domain 4. varia	Metric 7:	Metadata Completeness	Acceptable	3	well characterized	
OII OIit I	)-titi-	*	II:).	1 1		
Overall Quality I	Jeterminatio	on	High	1.4		
Extracted			Yes			
			- EXTRACTI	ON —		
Parameter	Parameter		Data			
Process Descripti	Process Description:		Note this source only contains concentrations of HBCD in selected soil samples			
Total Annual U.S	S. Volume (a	and percent of PV):	12,000 of 18,00	00 tons (	(2011 China)	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Oecd, 2007. SIDS initial assessment profile: Hexabromocyclododecane (HBCDD).  Data Type Hero ID  Oecd, 2007. SIDS initial assessment profile: Hexabromocyclododecane (HBCDD).  Facility; Manufacture; Manufacture / import; Reports for Data or Information Other than Exposure or Rele 3809146						
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	SIDS profiles are a trusted source	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	SIDS profiles are prepared by OECD nations. US did not prepare this SIDS profile.	
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but information could possibly be applied to import	
	Metric 4:	Temporal Representativeness	Acceptable	3	2007	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n*	Medium	2.2		
Extracted			Yes			
Parameter		– EXTRACTI Data	ON —			
Total Annual U.S. Volume (and percent of PV):			6,000 tonnes/yr MFG; 5,000 tonnes imported (EU15 - 2005)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		Oecd, 2007. SIDS initial assessment profile: Hexabromocyclododecane (HBCDD). Facility; Use; EPS and XPS foam; Reports for Data or Information Other than Exposure or Release Data; 3809146							
Domain		Metric	Rating	Score	Comments				
Domain 1: Reliab									
	Metric 1:	Methodology	Acceptable	3	SIDS profiles are a trusted source				
Domain 2: Repre	sentative								
	Metric 2:	Geographic Scope	Acceptable	3	SIDS profiles are prepared by OECD nations. US did not prepare this SIDS profile.				
	Metric 3:	Applicability	Acceptable	3	in scope				
	Metric 4:	Temporal Representativeness	Acceptable	3	2007				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
Domain 3: Access	sibility/Clar	rity							
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.				
Domain 4: Varial	oility and U	ncertainty							
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	2.0					
Extracted			Yes						
Parameter			- EXTRACTION	ON —					
Total Annual U.S	S. Volume (a	and percent of PV):	88 percent in I	EU used	for EPS and XPS				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	(HBCD) in	n China. Chemosphere.			ional and environmental risks of hexabromocyclododecar
Data Type Hero ID	Facility; M 3350493	Ianufacture; HBCD Production;	Reports for Dat	a or Info	ormation Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Unacceptable	4	China
	Metric 3:	Applicability	Unacceptable	4	Manufacture is not in scope and this information is not applicable to in-scope scenarios
	Metric 4:	Temporal Representativeness	Acceptable	3	2016
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Clar	itv			
Domain of Trees.	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	» n	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTI Data	ON	
Process Description: Number of Sites: Operating Days per Year and Batches per Day: Site Daily Throughput:			Consists of lar 14 5-10 bt/day 6,000 to 7,500	-	um, and small HBCD production plants

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		J. G.,Jin, J.,Zhu, J 2016. As China. Chemosphere.	sessment of the	occupat	ional and environmental risks of hexabromocyclododecane	
Data Type Hero ID			oorts for Data or	Informa	ation Other than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Unacceptable	4	China	
	Metric 3:	Applicability	Acceptable	3	in scope	
	Metric 4:	Temporal Representativeness	Acceptable	3	2016	
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.	
Domain 3: Acces	sibility/Clar	itv				
Domain of Treeses	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	hility and H	ncortainty				
Domain 4. Varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	on <sup>*</sup>	Medium	1.9		
Extracted			Yes			
			- EXTRACTI	ON —		
Parameter			Data			
Process Description: Number of Sites: Site Daily Throughput:			Consists of XPS flame retardant plants 520 1,500 to 1,900 t/a (not sure what these units are)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			sessment of the	occupat	ional and environmental risks of hexabromocyclododecane				
Data Type Hero ID	(HBCD) in China. Chemosphere. Facility; Processing; EPS formulation; Reports for Data or Information Other than Exposure or Release Data; 3350493								
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	bility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
	Metric 2:	Geographic Scope	Unacceptable	4	China				
	Metric 3:	Applicability	Unacceptable	4	EPS compounding not in scope and this information does not seem applicable to in-scope scenarios				
	Metric 4:	Temporal Representativeness	Acceptable	3	2016				
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.				
Domain 3: Acces	sibility/Clar	rity							
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.				
Domain 4: Varia	bility and U	ncertainty							
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determination	n*	Unacceptable	4.0					
Extracted			Yes						
			- EXTRACTION	ON					
Parameter			Data						
Process Descripti	ion:		Consists of EPS flame retardant plants						
Number of Sites:			65		-				
Site Daily Throu	ghput:		50,000 t/a (not sure what these units are)						

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation:		BCDD from construction and o			, X., Zhang, F., Wang, Q., Huang, Q., 2015. Environmental temporary and future issue. Environmental Science and		
Data Type Hero ID	Facility; Recycling; EPS and XPS foam; Reports for Data or Information Other than Exposure or Release D 3350517						
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
	Metric 2:	Geographic Scope	Acceptable	3	EU		
	Metric 3:	Applicability	Acceptable	3	in scope		
	Metric 4:	Temporal Representativeness	Acceptable	3	2015		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Acces	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varial	bility and U	ncertainty					
Domain 4. Varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	n*	Medium	1.8			
Extracted			Yes				
Parameter			– EXTRACTION ———— Data				
Process Descripti	Process Description:		Review of several soruces with information about HBCD in construction and demolition waste all over the world. Does not provide much novel				
Total Annual U.S. Volume (and percent of PV):				30 perc	iew of other industry data. ent of EPS and XPS foam is recycled in the EU		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Γype Facility; Use; HBCD Global Market Demand; Reports for Data or Information Other than Exposure or Release Data						
Domain		Metric	Rating	Score	Comments		
Domain 1: Reliab	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
•	Metric 2:	Geographic Scope	Acceptable	3	US		
	Metric 3:	Applicability	Acceptable	3	Contains both in-scope and out of scope uses		
	Metric 4:	Temporal Representativeness	Acceptable	3	2006		
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.		
Domain 3: Access	sibility/Clar	ity					
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varial	oility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	n*	Medium	2.1			
Extracted			Yes				
			- EXTRACTION	ON			
Parameter		Data					
Process Description: Total Annual U.S. Volume (and percent of PV):		Brominated flame redardant global market demand 16,700 metric tonnes globally in 2001 (2,800 metric tonnes in Americas in 2001)					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		A 2017. Preliminary informat uster (HBCD).	ion on manufa	acturing	, processing, distribution, use, and disposal: Cyclic aliphatic
Data Type Hero ID			cle stages; Re	ports for	Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
*	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Acceptable	3	in scope
	Metric 4:	Temporal Representativeness	Acceptable	3	2017
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar	ritv			
	Metric 6:	Metadata Completeness	Acceptable	3	Assessment or report clearly documents its data sources, assessment methods, results, and assumptions.
Domain 4: Varia	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	well characterized
Overall Quality I	Determinatio	n*	High	1.0	
Extracted			Yes		
Parameter			- EXTRACT Data	rion -	
Process Description:					created for the docket by EPA's OCSPP in 2017. iscussion on the life cycle of HBCD in the U.S.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	. 2004. Kirk-Othmer Encyclopedia of Chemical Technology. Facility; Manufacture; Manufacture of HBCD; Reports for Data or Information Other than Exposure or Release 3859418							
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	US			
	Metric 3:	Applicability	Unacceptable	4	Manufacture is not in scope and this information is not applicable to in-scope scenarios			
	Metric 4:	Temporal Representativeness	Acceptable	3	2004			
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type			
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	on"	Unacceptable	4.0				
Extracted			Yes					
Parameter			- EXTRACTION Data	ON				
Process Description:		-		CD is provided: Albermarle (US), DSBG (Israel), Chemicals, Ltd. (UK)				
Number of Sites:			4	//				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		Mack, A. G 2004. Flame retardants, halogenated. Facility; Manufacture; Manufacture of HBCD; Reports for Data or Information Other than Exposure or Release Data; 3859419							
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
•	Metric 2:	Geographic Scope	Acceptable	3	US				
	Metric 3:	Applicability	Unacceptable	4	Manufacture is not in scope and this information is not applicable to in-scope scenarios				
	Metric 4:	Temporal Representativeness	Acceptable	3	2004				
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type				
Domain 3: Acces	sibility/Claı Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.				
Domain 4: Varia	·	v	**						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0					
Extracted			Yes						
Parameter		_	- EXTRACTI Data	ON —					
Process Descripti	ion:		List of produce	ers and t	trade names of HBCD is provided				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation: Data Type Hero ID	,	Ashford, R. D 2001. Ashford's Dictionary of Industrial ChemicalsHexabromocyclododecane. Facility; All; HBCD; Reports for Data or Information Other than Exposure or Release Data; 3860436							
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	oility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
•	Metric 2:	Geographic Scope	Acceptable	3	UK				
	Metric 3:	Applicability	Acceptable	3	Physical properties are applicable to in scope uses				
	Metric 4:	Temporal Representativeness	Acceptable	3	2001				
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type				
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.				
Domain 4: Varial	bility and U: Metric 7:	ncertainty Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality Determination*		Medium	1.9						
Extracted			Yes						
Parameter			- EXTRACTI Data	ON					
Process Descripti	ion:		Provides physi	cal prop	perties of HBCD				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3$ .

Study Citation: Data Type Hero ID		nemical data reporting: 1,2,5,6,9 Ianufacture and import; Manufa		-	ecane. rts for Data or Information Other than Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relia	ability Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repr	Metric 2: Metric 3: Metric 4: Metric 5:	Geographic Scope Applicability Temporal Representativeness Sample Size	Acceptable Acceptable Acceptable N/A	3 3 3 N/A	US import information is in scope 2017 This metric does not relate to this data type		
Domain 3: Acce	ssibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varia	ability and U Metric 7:	ncertainty Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality	Determinatio	* Dn	High	1.5			
Extracted			Yes				
Parameter			EXTRAC Data	CTION			
Process Description:  Total Annual U.S. Volume (and percent of PV):  Number of Sites:  Possible Physical Form:  Chemical Concentration:			CDR data pulled from Chemview. Import site imports with HBCD never at import site. CBI 1 site MFG; 1 site Import Import site lists pellets as phys form. MFG site lists dry powder <1 percent in Building/Construction Materials				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	,	2017. PubChem: 1,2,5,6,9,10-E anufacture; Manufacture of HB	· ·		e. Information Other than Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Unacceptable	4	Manufacture is not in scope and this information is not applicable to in-scope scenarios	
	Metric 4:	Temporal Representativeness	Acceptable	3	2010-2011	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Access	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n*	Unacceptable	4.0		
Extracted	***********************************		Yes			
Parameter			– EXTRACTI Data	ON —		
Process Description: Total Annual U.S. Volume (and percent of PV):		PubChem data pulled form the Open Chemistry Database for HBCD.  10 million to 50 million pounds in 2002				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		2017. Pubchem Compound: H ll; HBCD; Reports for Data or l				
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
•	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Unacceptable	4	This information cannot be applied to any in-scope uses	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	hility and II	naontainty				
Domain 4. Varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	* n	Unacceptable	4.0		
Extracted			Yes			
Parameter		_	– EXTRACTI Data	ON —		
Process Description:			Search results for HBCD in Pubchem Compound. Identifies compounds with HBCD in the name but provides no extractable information.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. Hexabromocyclododecane. ll; HBCD; Reports for Data or l	Information Oth	er than	Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	UK	
	Metric 3:	Applicability	Acceptable	3	Trade names may be usefull for background information sections in the risk evaluation	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n *	High	1.6		
Extracted			Yes			
Parameter			– EXTRACTI Data	ON —		
Process Description:			Search results of searching HBCD in ECHA and provides several trade names for HBCD.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID					g: Substance name: Hexabromocyclododecane. ports for Data or Information Other than Exposure or Release Data;			
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	bility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	Sweden			
	Metric 3:	Applicability	Acceptable	3	Information is directly related to Import			
	Metric 4:	Temporal Representativeness	Acceptable	3	2009			
	Metric 5:	Sample Size	Acceptable	3	Wt fraction and PV provided in ranges with no other statistics			
Domain 3: Acces	ssibility/Cla	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	clearly documents its data sources			
Domain 4: Varia	bility and H	ncertainty						
	Metric 7:	Metadata Completeness	Acceptable	3	Some discussion			
OII OIi I	D-4i4i	*	TT:l.	1.0				
Overall Quality I	Determination	on	High	1.3				
Extracted			Yes					
			EXTRA	ACTIO	N			
Parameter			Data					
Total Annual U.S. Volume (and percent of PV):			Table 2-1 lis	sts impo	rt and MFG volumes for multiple countries			
	Possible Physical Form:			ess solid	*			
Chemical Concer			90-100 percent HBCD; impurities in HBCDD are usually less than 4 percent w/w.					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		6. Annex XV report: An assess le 69(2) of reach.	sment of whether	r the use	e of HBCDD in articles should be restricted in accordance
Data Type Hero ID	Facility; M 3970758	Ianufacture; Manufacture of HB	CD; Reports for	Data or	Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	bility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	EU
	Metric 3:	Applicability	Acceptable	3	Manufacture is not in scope but some info applies to import
	Metric 4:	Temporal Representativeness	Acceptable	3	2006-2007
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.
Domain 3: Acces	sibility/Cla	rity			
	Metric 6:	Metadata Completeness	Acceptable	3	clearly documents its data sources
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Acceptable	3	Some discussion
Overall Quality I	Determinatio	» N	Medium	1.9	
Extracted			Yes		
			- EXTRACTION	ON —	
Parameter			Data	_ • •	
Total Annual U.S. Volume (and percent of PV): Number of Sites: Chemical Concentration:		6,000 tonnes per year each MFG and imported in EU (2006/2007) 35 notifications from both producers and importers of articles. amount of contaminants/unknown constituents varies (0-5 percent)			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			ment of whether	the use	e of HBCDD in articles should be restricted in accordance			
D ( T		le $69(2)$ of reach.	. c D .	T C				
Data Type Hero ID		Facility; Processing; XPS compounding; Reports for Data or Information Other than Exposure or Release Data; 3970758						
nero ID	9910196							
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	EU			
	Metric 3:	Applicability	Acceptable	3	in scope			
	Metric 4:	Temporal Representativeness	Acceptable	3	2006-2007			
	Metric 5:	Sample Size	Unacceptable	4	characterized by no statistics.			
Domain 3: Acces	sibility/Cla	rity						
	Metric 6:	Metadata Completeness	Acceptable	3	clearly documents its data sources			
Domain 4: Varial	bility and U	ncertaintv						
	Metric 7:	Metadata Completeness	Acceptable	3	Some discussion			
Overall Quality I	Determinatio	on <sup>*</sup>	High	1.7				
Extracted	***************************************		Yes					
			- EXTRACTION	ON —				
Parameter			Data					
Total Annual U.S	S. Volume (ε	and percent of PV):	Number of site	s and u	se rates same as 3970759			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID		7. Uses at industrial sites: hexa [anufacturing/Processing/Use; H			or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
_	Metric 2:	Geographic Scope	Acceptable	3	EU
	Metric 3:	Applicability	Acceptable	3	This document is just a list of uses of HBCD. Some uses are in scope and some are out of scope.
	Metric 4:	Temporal Representativeness	Acceptable	3	No Date (cites a soucce from 2006)
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar Metric 6:	ity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	n **	Medium	2.1	
Extracted			Yes		
Parameter			- EXTRACTION Data	ON —	
Process Description:		Provides a general list of the manufacturing, processing, and use operations that are performed using HBCD. Only provides a short description.  No data was extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Echa,. 2017. Uses by professional workers: hexabromocyclododecane. Facility; All; HBCD; Reports for Data or Information Other than Exposure or Release Data; 3970763							
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
	Metric 2:	Geographic Scope	Acceptable	3	EU			
	Metric 3:	Applicability	Acceptable	3	This document is just a list of uses for HBCD articles. Some uses are in scope and some are out of scope.			
	Metric 4:	Temporal Representativeness	Acceptable	3	No Date (cites a soucce from 2006)			
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type			
Domain 3: Access	sibility/Clai Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	» N	Medium	2.1				
Extracted	***************************************		Yes					
Parameter		_	- EXTRACTI Data	ON —				
Process Description:			Provides a general list of potential uses for HBCD containing articles.  Only provides a short descriptions. No data was extracted.					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		. Flame retardants: Frequently ll; HBCD; Reports for Data or l	-	-	_			
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources - American Chemistry Council			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	US			
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.			
	Metric 4:	Temporal Representativeness	Unacceptable	4	No date			
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type			
Domain 3: Access	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial	oility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n*	Unacceptable	4.0				
Extracted			Yes					
Parameter			– EXTRACTI Data	ON —				
Process Descripti	Process Description:			Fact sheet on some questions about flame redardants and HBCD in the U.S. No data was extracted.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	Nicnas, 2013. NICNAS: Hexabromocyclododecane (HBCD). Facility; All; HBCD; Reports for Data or Information Other than Exposure or Release Data; 3978354							
Domain		Metric	Rating	Score	Comments			
Domain 1: Relial	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	esentative							
•	Metric 2:	Geographic Scope	Acceptable	3	US			
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.			
	Metric 4:	Temporal Representativeness	Acceptable	3	2013			
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type			
Domain 3: Acces	sibility/Clar	ity						
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial	bility and U	ncertainty						
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality I	Determinatio	n*	Unacceptable	4.0				
Extracted			Yes					
Parameter		_	- EXTRACTI Data	ON —				
Process Description:			Provides general background information. No information was extracted.					

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:			sheets & frequ	ently as	sked questions: Cyclododecane, $1,2,5,6,9,10$ -hexabromo-	
Data Type Hero ID		ocyclododecane; HBCD). ll; HBCD; Reports for Data or l	Information Oth	er than	Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Canada	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
D	-:L:1:4 /C1	:				
Domain 3: Acces	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	bility and H	ncartainty				
Domain 4. varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	»	Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Process Description:			Fact sheet on how HBCD is used and assessed in Canada. No information was extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		(PSA white paper " safety of FR Processing and Consumer Use; X			S foam insulation.  ports for Data or Information Other than Exposure or Release Data;				
Domain		Metric	Rating	Score	Comments				
Domain 1: Relial	bility								
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources				
Domain 2: Repre	esentative								
•	Metric 2:	Geographic Scope	Acceptable	3	US				
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.				
	Metric 4:	Temporal Representativeness	Acceptable	3	No Date (cites a soucce from 2013)				
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type				
Domain 3: Acces	Domain 3: Accessibility/Clarity  Metric 6: Metadata Completeness		Unacceptable	4	Assessment or report provides results, but the underlying				
					methods, data sources, and assumptions are not fully transparent.				
Domain 4: Varia	bility and H	ncortainty							
Domain 4. varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty				
Overall Quality I	Determinatio	on <sup>*</sup>	Unacceptable	4.0					
Extracted			Yes						
			EXTRA	CTION					
Parameter			Data	01101	•				
Process Descripti	Process Description:				Fact sheet about using HBCD in XPS Foam Insulation written by the Extruded Polystryene Foam Association. No information was extracted.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1$  to <1.7;  $\text{Medium}=\geq 1.7$  to <2.4;  $\text{Low}=\geq 2.4$  to <3.

Study Citation: Data Type Hero ID		PS industry perspective on susta rocessing and Consumer Use; X			ntal awareness. ports for Data or Information Other than Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	bility Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
	Metric 1.	Wethodology	Ассергавіе	- 3	Information is nom-reasted sources
Domain 2: Repre					
	Metric 2:	Geographic Scope	Acceptable	3	US
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.
	Metric 4:	Temporal Representativeness	Acceptable	3	2012
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Access	. ,	2	TI	4	
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully trans- parent.
Domain 4: Varial	bility and U	Incertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determination	on <sup>*</sup>	Unacceptable	4.0	
Extracted			Yes		
			— EXTRA	CTION	J
Parameter			Data		
Process Descripti				g HBCD in XPS Foam Insulation written by the Foam Association. No information was extracted.	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		7. SPIN substances in preparati ll; HBCD; Reports for Data or l			yclododecane, 1, 2, 5, 6, 9, 10-hexabromo. Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Sweden, Norway, Denmark, and Finland	
	Metric 3:	Applicability	Acceptable	3	This document includes all uses of HBCD. Some uses are in scope and some are out of scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	oility and U	ocertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	$ m n^*$	Medium	1.9		
Extracted			Yes			
Parameter		- EXTRACTION Data	ON			
Process Description:			A database for nordic countries HBCD use over the years in several life cycle stages. Note that most of the info is confidential.			
Total Annual U.S. Volume (and percent of PV):				nes per	year (in nordic countries - Finland, Denmark,	

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7$ ;  $\text{Medium}=\geq 1.7 \text{ to } < 2.4$ ;  $\text{Low}=\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	-	Flame Retardants, Association. ll; HBCD; Reports for Data or l			fact sheet hexabromocyclododecane. Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe (Belgium)	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2006	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Access	sibility/Clar	rity				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	sility and H	neartainty				
Domaii 4. variai	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n*	Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Process Description:			Fact sheet on how HBCD is used and assessed in the EU. No information was extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation: Data Type Hero ID	1	Flame Retardants, Association. ll; HBCD; Reports for Data or l			1
Domain		Metric	Rating	Score	Comments
Domain 1: Relial	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	esentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.
	Metric 4:	Temporal Representativeness	Acceptable	3	2017
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar	rity			
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	bility and U	ncertainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	n <sup>*</sup>	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTION Data	ON —	
Process Description:				retarda	tranportation industry sectors that use several nts (including HBCD) in transport applications. tracted.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Data Type	-	Flame Retardants, Association. ll; HBCD; Reports for Data or l		_		
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliabi	lity					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repres	entative					
•	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Accessi	ibility/Clar	itv				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Variabi	ility and III	ncortainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality De	eterminatio	n*	Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Process Description:			Fact sheet about the use of flame retardants (including HBCD) in structural elements (e.g., foam insulation, electronics). No information was extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	-	Brominated Flame Retardant In ll; HBCD; Reports for Data or I			frip our substances, hexabromocyclododecane (HBCD). Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2017	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	sibility/Cla	ity				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality I	Determinatio	n*	Unacceptable	4.0		
Extracted			Yes			
Parameter			– EXTRACTI Data	ON —		
Process Description:			General discussion about the uses of HBCD. No information was extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		3. K 2002. Waste in the Wirele electronic devices.	ess World: The C	hallenge	e of Cell PhonesChapter 3: The toxic content of cell phon		
Data Type Hero ID	Facility; A 3982069	ll; HBCD; Reports for Data or l	Information Othe	er than l	Exposure or Release Data;		
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	sentative						
*	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Acceptable	3	This document includes all uses of HBCD. Some uses are in scope and some are out of scope.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2004		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Acces	sibility/Clar	itv					
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	on*	Medium	2.1			
Extracted			Yes				
Parameter			EXTRACTION ————————————————————————————————————				
Process Descripti	on:		Provides the 1999 Market Demand for HBCD in Europe, Americas, and Asia				
Total Annual U.S. Volume (and percent of PV):			Americas - 3,100 metric tons/yearEurope - 8,900 metric tons/yrAsia - 3,900 metric tons/yr (in 1999)				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

	to. Correction to article pinfa no ll; HBCD; Reports for Data or l		-	g of plastics containing hazardous substances'. Exposure or Release Data;		
	Metric	Rating	Score	Comments		
oility						
Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
sentative						
Metric 2:	Geographic Scope	Acceptable	3	Europe		
Metric 3:			4	Not detailed enough to provide data in scope.		
Metric 4:		Acceptable	3	2017		
Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
sibility/Clar	ritv					
Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
sility and H	naortainty					
Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
eterminatio	* M	Unacceptable	4.0			
		Yes				
		- EXTRACTI Data	ON —			
Process Description:			General discussion about the Phosphorous, Inorganic, & Nitrogen Flame Retardants Association. No information was extracted.			
3	3982156  sility Metric 1: sentative Metric 2: Metric 3: Metric 5: sibility/Clar Metric 6:  pility and United the determination	Metric  Metric  Metric 1: Methodology  Sentative  Metric 2: Geographic Scope  Metric 3: Applicability  Metric 4: Temporal Representativeness  Metric 5: Sample Size  Sibility/Clarity  Metric 6: Metadata Completeness  Dility and Uncertainty  Metric 7: Metadata Completeness  Determination**	Metric Rating  Metric 1: Methodology Acceptable  Sentative Metric 2: Geographic Scope Acceptable Metric 3: Applicability Unacceptable Metric 4: Temporal Representativeness Acceptable Metric 5: Sample Size N/A  Sibility/Clarity Metric 6: Metadata Completeness Unacceptable  Dility and Uncertainty Metric 7: Metadata Completeness Unacceptable  Determination*  Wes  EXTRACTIO Data  General discuss	Metric Rating Score  Metric Rating Score  Metric 1: Methodology Acceptable 3  Sentative  Metric 2: Geographic Scope Acceptable 3  Metric 3: Applicability Unacceptable 4  Metric 4: Temporal Representativeness Acceptable 3  Metric 5: Sample Size N/A N/A  Sibility/Clarity  Metric 6: Metadata Completeness Unacceptable 4  Determination*  Unacceptable 4  Metric 7: Metadata Completeness Unacceptable 4  Determination*  Metric 7: Metadata Completeness Unacceptable 4  Determination*  General discussion about the string of th		

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High= $\geq 1$  to < 1.7; Medium = $\geq 1.7$  to < 2.4; Low = $\geq 2.4$  to < 3.

Study Citation:	,		flame retardant	s in tra	nsportations, non-halogenated phosphorus, inorganic and
Data Type Hero ID	_	ame retardants. ll; HBCD; Reports for Data or l	Information Oth	er than	Exposure or Release Data;
Domain		Metric	Rating	Score	Comments
Domain 1: Reliab	oility				
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources
Domain 2: Repre	sentative				
	Metric 2:	Geographic Scope	Acceptable	3	Europe (Belgium)
	Metric 3:	Applicability	${\bf Unacceptable}$	4	Not detailed enough to provide data in scope.
	Metric 4:	Temporal Representativeness	Acceptable	3	2010
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type
Domain 3: Acces	sibility/Clar	itv			
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.
Domain 4: Varial	hility and H	ncortainty			
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty
Overall Quality I	Determinatio	n*	Unacceptable	4.0	
Extracted			Yes		
Parameter			- EXTRACTI Data	on —	
Process Description:			seats, cables,	and elec	ame redardants in fire test, interior parts, textiles, etronics. Comparison between halogenated and e retardants. No information was extracted.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	: Structural Insulated Panel, Association. 2017. Expanded polystyrene flame retardants. Facility; Processing; EPS formulation; Reports for Data or Information Other than Exposure or Release Data; 3982180						
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	oility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
1	Metric 2:	Geographic Scope	Acceptable	3	Europe		
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2017		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying		
		•	1		methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality I	Determinatio	n*	Unacceptable	4.0			
Extracted			Yes				
Parameter		_	– EXTRACTI Data	ON —			
Process Description:			Fact sheet on flame retardants used in EPS . No information was extracted.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:		. RE: Norway's prohibition on /N under EU 98/34 procedure.	certain hazardo	us subst	ances in consumer products; Norway notification number	
Data Type Hero ID		ll; HBCD; Reports for Data or l	Information Othe	er than l	Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repres	sentative					
*	Metric 2:	Geographic Scope	Acceptable	3	Europe	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2007	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Access	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Variab	sility and H	neartainty				
Domain 4. Variat	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality Determination*			Unacceptable	4.0		
Extracted			Yes			
Parameter			– EXTRACTI Data	ON —		
Process Description:			IPC (Association Connecting Electronics Industries) comments on Norway's Prohibition on Certain Hazardous Substances in Consumer Products; Norway Notification Number 2007/9016/N under EU 98/34 Procedure			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High} = \geq 1 \text{ to } < 1.7$ ;  $\text{Medium} = \geq 1.7 \text{ to } < 2.4$ ;  $\text{Low} = \geq 2.4 \text{ to } < 3.$ 

Study Citation: Sipa, 2012. Technical bulletin no. 6: SIPs and HBCD flame retardants.  Data Type Facility; All; HBCD; Reports for Data or Information Other than Exposure or Release Data;  Hero ID 3982469						
Domain		Metric	Rating	Score	Comments	
Domain 1: Relial	bility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	esentative					
•	Metric 2:	Geographic Scope	Acceptable	3	US	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	sibility/Clar	itv				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Damain 4. Vania	bility and II	n containty				
Domain 4: Varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality Determination*			Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Process Description:			Fact sheet about HBCD in the US and Canada. No information was extracted			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Type Facility; Use; HBCD in Children's products; Reports for Data or Information Other than Exposure or Release Data;							
Domain		Metric	Rating	Score	Comments			
Domain 1: Reliab	oility							
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources			
Domain 2: Repre	sentative							
	Metric 2:	Geographic Scope	Acceptable	3	US			
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.			
	Metric 4:	Temporal Representativeness	Acceptable	3	2016			
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type			
Domain 3: Acces	sibility/Cla	rity						
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.			
Domain 4: Varial	bility and H	ncortainty						
Domain 4. Varia	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty			
Overall Quality Determination*			Unacceptable	4.0				
Extracted			Yes					
Parameter			- EXTRACTI Data	ON —				
Process Descripti	Process Description:			News article about the restriction of HBCD in children's products in Washington state. No information was extracted.				

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID	Data Type Facility; All; HBCD; Reports for Data or Information Other than Exposure or Release Data;						
Domain		Metric	Rating	Score	Comments		
Domain 1: Relial	bility						
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources		
Domain 2: Repre	esentative						
•	Metric 2:	Geographic Scope	Acceptable	3	Sweden		
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.		
	Metric 4:	Temporal Representativeness	Acceptable	3	2003		
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type		
Domain 3: Acces	sibility/Clar Metric 6:	rity Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.		
Domain 4: Varial	bility and U	ncertainty					
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty		
Overall Quality Determination*			Unacceptable	4.0			
Extracted			Yes				
Parameter			- EXTRACTI Data	ON —			
Process Descripti	Process Description:			Provides a list of brominated flame retardants that are commercially available. No information was extracted.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation: Data Type Hero ID		urning Questions, ENFIRO 2-da ll; HBCD; Reports for Data or l		er than	Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	Brussels	
	Metric 3:	Applicability	Unacceptable	4	Not detailed enough to provide data in scope.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2012	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	. ,	2				
	Metric 6:	Metadata Completeness	Unacceptable	4	Assessment or report provides results, but the underlying methods, data sources, and assumptions are not fully transparent.	
Domain 4: Varial	bility and U	ncertainty				
	Metric 7:	Metadata Completeness	Unacceptable	4	No discussion of variability or uncertainty	
Overall Quality Determination*			Unacceptable	4.0		
Extracted			Yes			
Parameter			- EXTRACTI Data	ON —		
Process Description:			Provides a compilation of abstracts from a flame retardant conference. Does not provide extractable information.			

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $\text{High}=\geq 1 \text{ to } < 1.7; \text{ Medium } =\geq 1.7 \text{ to } < 2.4; \text{ Low } =\geq 2.4 \text{ to } < 3.$ 

Study Citation:	Echa, 2009. Data on manufacture, import, export, uses and releases of HBCDD as well as information on potential alternatives to its use.					
Data Type Hero ID		ll; HBCD; Reports for Data or l	Information O	ther tha	n Exposure or Release Data;	
Domain		Metric	Rating	Score	Comments	
Domain 1: Reliab	oility					
	Metric 1:	Methodology	Acceptable	3	Information is from trusted sources	
Domain 2: Repre	sentative					
•	Metric 2:	Geographic Scope	Acceptable	3	Multiple European countries	
	Metric 3:	Applicability	Acceptable	3	Provides information on both in-scope and out of scope uses.	
	Metric 4:	Temporal Representativeness	Acceptable	3	2009	
	Metric 5:	Sample Size	N/A	N/A	This metric does not relate to this data type	
Domain 3: Acces	sibility/Clar Metric 6:	ity Metadata Completeness	Acceptable	3	fully transparent.	
Domain 4: Varial	oility and U	ncertainty				
	Metric 7:	Metadata Completeness	Acceptable	3	discussion of variability or uncertainty	
Overall Quality Determination*		High	1.4			
Extracted			Yes			
Parameter			EXTRACTION ————————————————————————————————————			
Process Description:			Provides process descriptions that are taken from the EURAR (HERO ID 3970747)			
Total Annual U.S. Volume (and percent of PV):			Provides european data on the market breakdown of HBCD use (Pages 2 - 3)			

If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  $High=\geq 1$  to < 1.7;  $Medium=\geq 1.7$  to < 2.4;  $Low=\geq 2.4$  to < 3.